



SEQUENCE LISTING

<110> Zur Megede, Jan
Barnett, Susan W.
Engelbrecht, Susan
van Rensburg, Estrelita Janse

<120> Polynucleotides Encoding Antigenic HIV Type C Polypeptides,
Polypeptides and Uses Thereof

<130> PP01631.102

<140> 09/899,575
<141> 2001-07-05

<150> 09/610,313
<151> 2000-07-05

<160> 147

<170> PatentIn version 3.4

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cccgccgaga gcttcgcgtt cgaggagacc acccccgccc ccaagcagga gccaaggac	1440
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agccagtaa	1509

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<220>
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ctgctgaccc gcgacggcgg c	141

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<220>
 <223> synthetic gp120 coding region of HIV strain AF110968

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tggggccacc acgcctgcgt gccaccgcac cccaaccccc aggagatcgt gctggagaac	180
gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc	240
atcagcctgt gggaccagag cctgaagccc tgcgtgaagc tgacccccct gtgcgtgacc	300
ctgaagtgcc gcaacgtgaa cgccaccaac aacatcaaca gcatgatcga caacagcaac	360
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gaggtgcacg ccctgttcta ccgcctggac gtggtgcccc tgcagggcaa caacagcaac	480
gagtaccgcc tgatcaactg caacaccagc gccatcacc aggcctgccc caaggtgagc	540
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ggcatcaagc ccgtggtgag caccagctg ctgctgaacg gcagcctggc caagggcgag	720
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cgcgacggcg gcaagaccgg cccaacgac accgagatct tccgccccgg cggcggcgac	1320
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<220>
 <223> synthetic gp140 coding region of HIV strain AF110968

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tgggccaccc acgcctgcgt gccaccgac cccaaccccc aggagatcgt gctggagaac	180
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gagcatttca gcaagaaggc catcaagttc gagcccagca gcggcggcga cctggagatc	1020
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 <212> DNA
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gaccagatgc	360
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agcatgatcg	480
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caggcctgcc	660
tacgccatcc	720
agcagcgtgc	780
ggcagcctgg	840
atcatcatcg	900
acccgcaaga	960
ggcgacatcc	1020
ggcgtgagca	1080
agcggcggcg	1140
tgcgacacca	1200

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 <212> DNA
 <213> Artificial

<220>
 <223> synthetic a gp41 coding region of HIV strain AF110968

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<210> 11
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 <212> DNA
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<220>
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<400> 11	
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 <212> DNA
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<223> synthetic gp120 coding region of HIV strain AF110975

<400> 12

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tgggccaccc acgcctgcgt gccaccgac cccaaccccc aggagatcga gctggacaac     180
gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc     240
atcagcctgt gggaccagag cctgaagccc cgcgtgaagc tgacccccct gtgcgtgacc     300
ctgaagtgca ccaactacag caccaactac agcaacacca tgaacgccac cagctacaac     360
aacaacacca ccgaggagat caagaactgc accttcaaca tgaccaccga gctgcgcgac     420
aagaagcagc aggtgtacgc cctgttctac aagctggaca tcgtgcccct gaacagcaac     480
agcagcgagt accgcctgat caactgcaac accagcgcca tcaccaggc ctgccccaaag     540
gtgagcttcg accccatccc catccactac tgcgcccccg ccggctacgc catcctgaag     600
tgcaagaaca acaccagcaa cggcaccggc ccctgccaga acgtgagcac cgtgcagtgc     660
accacggca tcaagcccgt ggtgagcacc cccctgctgc tgaacggcag cctggccgag     720
ggcggcgaga tcatcatccg cagcaagaac ctgagcaaca acgcctacac catcatcgtg     780
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caggcccact gcaacatcag cgccggcgag tggacaagc cgtgcagcg cgtgagcgcc     960
aagctgcgcg agcacttccc caacaagacc atcgagttcc agcccagcag cggcggcgac    1020
ctggagatca ccaccacag cttcaactgc cgcgcgaggt tcttctactg caacaccagc    1080
aagctgttca acagcagcta caacggcacc agctaccgcg gcaccgagag caacagcagc    1140
atcatcacc tgccctgccg catcaagcag atcatcgaca tgtggcagaa ggtgggcccgc    1200
gccatctacg ccccccccat cgagggcaac atcacctgca gcagcagcat caccggcctg    1260
ctgctggccc gcgacggcgg cctggacaac atcaccaccg agatcttccg ccccagggc    1320
ggcgacatga aggacaactg gcgcaacgag ctgtacaagt acaaggtggt ggagatcaag    1380
cccctgggcg tggccccac cgaggccaag cgccgcgtgg tggagcgca gaagcgc      1437
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<210> 13

<211> 1950

<212> DNA

<213> Artificial

<220>

<223> synthetic gp140 coding region of HIV strain AF110975

<400> 13

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tggggcaccc acgcctgcgt gcccaccgac cccaaccccc aggagatcga gctggacaac	180
gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc	240
atcagcctgt gggaccagag cctgaagccc cgcgtaagc tgacccccct gtgcgtgacc	300
ctgaagtgca ccaactacag caccaactac agcaacacca tgaacgccac cagctacaac	360
aacaacacca ccgaggagat caagaactgc accttcaaca tgaccaccga gctgcgcgac	420
aagaagcagc aggtgtacgc cctgtttctac aagctggaca tcgtgccccct gaacagcaac	480
agcagcgagt accgcctgat caactgcaac accagcgcca tcaccaggc ctgcccgaag	540
gtgagcttcg accccatccc catccactac tgcgcccccg ccggctacgc catcctgaag	600
tgcaagaaca acaccagcaa cggcaccggc ccctgccaga acgtgagcac cgtgcagtgc	660
accacggca tcaagcccgt ggtgagcacc cccctgctgc tgaacggcag cctggccgag	720
ggcggcgaga tcatcatccg cagcaagaac ctgagcaaca acgcctacac catcatcgtg	780
cacctgaacg acagcgtgga gatcgtgtgc acccgcccca acaacaacac ccgcaagggc	840
atccgcatcg gccccggcca gaccttctac gccaccgaga acatcatcgg cgacatccgc	900
caggcccact gcaacatcag cgccggcgag tggaacaagg ccgtgcagcg cgtgagcgcc	960
aagctgcgcg agcaattccc caacaagacc atcgagttcc agcccagcag cggcggcgac	1020
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aagctgttca acagcagcta caacggcacc agctaccgcg gcaccgagag caacagcagc	1140
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gccatctacg cccccccat cgagggaac atcacctgca gcagcagcat caccggcctg	1260
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cccctgggcg tggccccac cgaggccaag cgccgcgtgg tggagcgca gaagcgcgcc	1440
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gccagcatca ccctgaccgc ccaggccgc cagctgctga gcggcatcgt gcagcagcag	1560

agcaacctgc tgcgcgccat cgaggcccag cagcacatgc tgcagctgac cgtgtggggc 1620
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 aaggagatca gcaactacac cggcatcatc taccgcctgc tggaggagag ccagaaccag 1860
 caggagcaga acgagaagga cctgctggcc ctggacagcc gcaacaacct gtggagctgg 1920
 ttcaacatca gcaactggct gtggtacatc 1950

<210> 14
 <211> 2493
 <212> DNA
 <213> Artificial

<220>
 <223> synthetic gp160 coding region of HIV strain AF110975

<400> 14
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 tggggcaccc acgcctgcgt gcccaccgac cccaaccccc aggagatcga gctggacaac 180
 gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc 240
 atcagcctgt gggaccagag cctgaagccc cgcgtgaagc tgacccccct gtgcgtgacc 300
 ctgaagtgca ccaactacag caccaactac agcaacacca tgaacgccac cagctacaac 360
 aacaacacca ccgaggagat caagaactgc accttcaaca tgaccaccga gctgcgcgac 420
 aagaagcagc aggtgtacgc cctgtttctac aagctggaca tcgtgcccct gaacagcaac 480
 agcagcgagt accgcctgat caactgcaac accagcgcca tcaccaggc ctgcccgaag 540
 gtgagcttcg accccatccc catccactac tgcgcccccg ccggctacgc catcctgaag 600
 tgcaagaaca acaccagcaa cggcaccggc ccctgccaga acgtgagcac cgtgcagtgc 660
 acccacggca tcaagcccgt ggtgagcacc cccctgctgc tgaacggcag cctggccgag 720
 gggggcgaga tcatcatccg cagcaagaac ctgagcaaca acgcctacac catcatcgtg 780
 cacctgaacg acagcgtgga gatcgtgtgc acccgcccca acaacaacac ccgcaagggc 840
 atccgcatcg gccccggcca gaccttctac gccaccgaga acatcatcgg cgacatccgc 900
 caggcccact gcaacatcag cgccggcgag tggaacaagg ccgtgcagcg cgtgagcgcc 960
 aagctgcgcg agcacttccc caacaagacc atcgagttcc agcccagcag cggcggcgac 1020

ctggagatca ccacccacag cttcaactgc cgcggcgagt tcttctactg caacaccagc	1080
aagctgttca acagcagcta caacggcacc agctaccgcg gcaccgagag caacagcagc	1140
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gccatctacg cccccccat cgagggcaac atcacctgca gcagcagcat caccggcctg	1260
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cccctgggcg tggccccac cgaggccaag cgccgcgtgg tggagcgcga gaagcgcgc	1440
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gccagcatca ccctgaccgc ccaggccgc cagctgctga gcggcatcgt gcagcagcag	1560
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cgcgctgcgc agggcttcga ggccgccctg cag	2493

<210> 15
 <211> 2565
 <212> DNA
 <213> Artificial

<220>

<223> synthetic signal sequence and gp160 coding region of HIV strain
AF110975

<400> 15

atgcgcgtgc	gcgccatcct	gcgagctgg	cagcagtgg	ggatctgggg	catcctgggc	60
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tggcgcgagg	ccagcaccac	cctgtttctg	gccagcgacg	ccaaggccta	cgagaaggag	180
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gagctggaca	acgtgaccga	gaacttcaac	atgtggaaga	acgacatgg	ggaccagatg	300
cacgaggaca	tcacagcct	gtgggaccag	agcctgaagc	cccgcgtgaa	gctgaccccc	360
ctgtgcgtga	ccctgaagtg	caccaactac	agcaccaact	acagcaacac	catgaacgcc	420
accagctaca	acaacaacac	caccgaggag	atcaagaact	gcaccttcaa	catgaccacc	480
gagctgcgcg	acaagaagca	gcaggtgtac	gccctgttct	acaagctgga	catcgtgccc	540
ctgaacagca	acagcagcga	gtaccgcctg	atcaactgca	acaccagcgc	catcaccacg	600
gcctgcccc	aggtgagctt	cgaccccatc	cccatccact	actgcgcccc	cgccggctac	660
gccatcctga	agtgcaagaa	caacaccagc	aacggcaccg	gcccctgcca	gaacgtgagc	720
accgtgcagt	gcaccacagg	catcaagccc	gtggtgagca	ccccctgct	gctgaacggc	780
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acccgcaagg	gcatccgcat	cggccccggc	cagaccttct	acgccaccga	gaacatcatc	960
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cgcacccagg	gcggcgacat	gaaggacaac	tggcgcaacg	agctgtacaa	gtacaagggtg	1440
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ctgtggagct	ggttcaacat	cagcaactgg	ctgtggtaca	tcaagatctt	catcatgatc		2040
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cggcagggt	acagccccct	gagcttccag	accctgaccc	ccaacccccg	cggcctggac		2160
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tactggggcc	tggagctgaa	gaagagcgcc	accagcctgc	tggacagcat	cgccatcgcc		2460
gtggccgagg	gcaccgaccg	catcatcgag	gtgatccagc	gcactaccg	cgccttctgc		2520
aacatcccc	gccgcgtgcg	ccagggttc	gaggccgccc	tgcag			2565

<210> 16
 <211> 1056
 <212> DNA
 <213> Artificial

<220>
 <223> synthetic a gp41 coding region of HIV strain AF110975

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cagagcaacc	tgctgcgcgc catcgaggcc cagcagcaca tgctgcagct gaccgtgtgg 180
ggcatcaagc	agctgcaggc ccgcgtgctg gccatcgagc gctacctgaa ggaccagcag 240
ctgctgggca	tctggggctg cagcggcaag ctgatctgca ccaccaccgt gccctggaac 300
agcagctgga	gcaacaagac ccagggcgag atctgggaga acatgacctg gatgcagtgg 360
gacaaggaga	tcagcaacta caccggcatc atctaccgcc tgctggagga gagccagaac 420

cagcaggagc agaacgagaa ggacctgctg gccctggaca gccgaacaa cctgtggagc 480
tggttcaaca tcagcaactg gctgtggtac atcaagatct tcatcatgat cgtgggaggc 540
ctgatcggcc tgcgcatcat cttcgccgtg ctgagcatcg tgaaccgcgt gcgccagggc 600
tacagcccc tgagcttcca gacctgacc cccaaccccc gcggcctgga ccgcctgggc 660
cgcatcgagg aggagggcgg cgagcaggac cgcgaccgca gcatccgcct ggtgcagggc 720
ttcctggccc tggcctggga cgacctgcg agcctgtgcc tgttcagcta ccaccgcctg 780
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ggcaccgacc gcatcatcga ggtgatccag cgcatctacc gcgccttctg caacatcccc 1020
cgccgcgtgc gccagggctt cgaggccgcc ctgcag 1056

<210> 17
<211> 492
<212> PRT
<213> Human immunodeficiency virus

<400> 17

Met Gly Ala Arg Ala Ser Ile Leu Arg Gly Gly Lys Leu Asp Ala Trp
1 5 10 15

Glu Arg Ile Arg Leu Arg Pro Gly Gly Lys Lys Cys Tyr Met Met Lys
20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Lys Phe Ala Leu Asn Pro
35 40 45

Gly Leu Leu Glu Thr Ser Glu Gly Cys Lys Gln Ile Ile Arg Gln Leu
50 55 60

His Pro Ala Leu Gln Thr Gly Ser Glu Glu Leu Lys Ser Leu Phe Asn
65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Glu Lys Ile Glu Val Arg Asp
85 90 95

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Cys Gln
100 105 110

Gln Lys Ile Gln Gln Ala Glu Ala Ala Asp Lys Gly Lys Val Ser Gln
115 120 125

Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala
130 135 140

Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu Glu Lys
145 150 155 160

Ala Phe Ser Pro Glu Val Ile Pro Met Phe Thr Ala Leu Ser Glu Gly
165 170 175

Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His
180 185 190

Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala
195 200 205

Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ile Ala Pro Gly
210 215 220

Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr
225 230 235 240

Leu Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Ile Pro Val
245 250 255

Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val
260 265 270

Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Lys Gln Gly Pro Lys
275 280 285

Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala
290 295 300

Glu Gln Ser Thr Gln Glu Val Lys Asn Trp Met Thr Asp Thr Leu Leu
305 310 315 320

Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala Leu Gly
325 330 335

Pro Gly Ala Ser Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly
 340 345 350

Gly Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala
 355 360 365

Asn Thr Ser Val Met Met Gln Lys Ser Asn Phe Lys Gly Pro Arg Arg
 370 375 380

Ile Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Arg Asn
 385 390 395 400

Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly
 405 410 415

His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys
 420 425 430

Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser Arg
 435 440 445

Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Arg Phe Glu Glu Thr
 450 455 460

Thr Pro Gly Gln Lys Gln Glu Ser Lys Asp Arg Glu Thr Leu Thr Ser
 465 470 475 480

Leu Lys Ser Leu Phe Gly Asn Asp Pro Leu Ser Gln
 485 490

<210> 18
 <211> 81
 <212> DNA
 <213> Artificial

<220>
 <223> synthetic signal sequence of HIV strain AF110968

<400> 18
 atgcgcgtga tgggcatcct gaagaactac cagcagtggt ggatgtgggg catcctgggc 60
 ttctggatgc tgatcatcag c 81

<210> 19
 <211> 72

<212> DNA
 <213> Artificial

<220>
 <223> synthetic signal sequence of HIV strain AF110975

<400> 19
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 ttctggatct gc 72

<210> 20
 <211> 1479
 <212> DNA
 <213> Artificial

<220>
 <223> synthetic Gag coding sequence of HIV strain AF110965

<400> 20
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 ctgcgccccg gcggaagaa gtgctacatg atgaagcacc tgggtgtgggc cagccgcgag 120
 ctggagaagt tcgcctgaa ccccggcctg ctggagacca gcgagggctg caagcagatc 180
 atccgccagc tgcacccgc cctgcagacc ggcagcgagg agctgaagag cctgttcaac 240
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 ctggacaaga tcgaggagga gcagaacaag tgccagcaga agatccagca ggccgaggcc 360
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 gtgcaccagg ccatcagccc ccgcacctg aacgcctggg tgaaggtgat cgaggagaag 480
 gccttcagcc ccgaggtgat ccccatgttc accgccctga gcgagggcgc cccccccag 540
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 aagcgctgga tcacctggg cctgaacaag atcgtgcgca tgtacagccc cgtgagcatc 840
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ccgggcaact	tctgcagag	ccgccccgag	cccaccgccc	ccccgcgga	gagcttccgc	1380
ttcgaggaga	ccacccccgg	ccagaagcag	gagagcaagg	accgcgagac	cctgaccagc	1440
ctgaagagcc	tgttcggcaa	cgacccccctg	agccagtaa			1479

<210> 21
 <211> 1509
 <212> DNA
 <213> Artificial

<220>

<223> synthetic Gag coding sequence of HIV strain AF110967

<400> 21	
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ctggaggggt	tgcacctgaa ccccggcctg ctggagaccg ccgagggctg caagcagatc 180
atgaagcagc	tgcagccccg cctgcagacc ggcaccgagg agctgcgcag cctgtacaac 240
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ctggacaaga	tcgaggagga gcagaacaag agccagcaga agaccagca ggccaaggag 360
gccgacggca	aggtgagcca gaactacccc atcgtgcaga acctgcaggg ccagatggtg 420
caccaggcca	tcagcccccg caccctgaac gcctgggtga aggtgatcga ggagaaggcc 480
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gcccccgccc	agatgcgcga cccccgcggc agcgacatcg ccggcgccac cagcaccctg 720
caggagcaga	tcgcctggat gaccagcaac cccccgtgc ccgtgggcga catctacaag 780
cgctggatca	tcttgggcct gaacaagatc gtgcgcgatgt acagccccgt gagcatcctg 840
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gccgaggcca tgagccaggc caacagcgctg aacatcatga tgcagaagag caacttcaag 1140
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tgccgcgccc cccgcaagaa gggctgctgg aagtgcggca aggagggcca ccagatgaag 1260
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cccgccgaga gcttccgctt cgaggagacc acccccgccc ccaagcagga gccaaggac 1440
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agccagtaa 1509

<210> 22
<211> 502
<212> PRT
<213> Human immunodeficiency virus

<400> 22

Met Gly Ala Arg Ala Ser Ile Leu Arg Gly Glu Lys Leu Asp Lys Trp
1 5 10 15

Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys His Tyr Met Leu Lys
20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Gly Phe Ala Leu Asn Pro
35 40 45

Gly Leu Leu Glu Thr Ala Glu Gly Cys Lys Gln Ile Met Lys Gln Leu
50 55 60

Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Leu Arg Ser Leu Tyr Asn
65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Ala Gly Ile Glu Val Arg Asp
85 90 95

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Ser Gln
100 105 110

Gln Lys Thr Gln Gln Ala Lys Glu Ala Asp Gly Lys Val Ser Gln Asn
115 120 125

Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala Ile
130 135 140

Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu Glu Lys Ala
145 150 155 160

Phe Ser Pro Glu Val Ile Pro Met Phe Thr Ala Leu Ser Glu Gly Ala
165 170 175

Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln
180 185 190

Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu
195 200 205

Trp Asp Arg Leu His Pro Val Gln Ala Gly Pro Val Ala Pro Gly Gln
210 215 220

Met Arg Asp Pro Arg Gly Ser Asp Ile Ala Gly Ala Thr Ser Thr Leu
225 230 235 240

Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Val Pro Val Gly
245 250 255

Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg
260 265 270

Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu
275 280 285

Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu
290 295 300

Gln Ala Thr Gln Asp Val Lys Asn Trp Met Thr Glu Thr Leu Leu Val
305 310 315 320

Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala Leu Gly Pro
325 330 335

Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Gly
340 345 350

Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala Asn
 355 360 365

Ser Val Asn Ile Met Met Gln Lys Ser Asn Phe Lys Gly Pro Arg Arg
 370 375 380

Asn Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Lys Asn
 385 390 395 400

Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly
 405 410 415

His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys
 420 425 430

Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Asn Arg
 435 440 445

Ser Glu Pro Ala Ala Pro Thr Val Pro Thr Ala Pro Pro Ala Glu Ser
 450 455 460

Phe Arg Phe Glu Glu Thr Thr Pro Ala Pro Lys Gln Glu Pro Lys Asp
 465 470 475 480

Arg Glu Pro Tyr Arg Glu Pro Leu Thr Ala Leu Arg Ser Leu Phe Gly
 485 490 495

Ser Gly Pro Leu Ser Gln
 500

<210> 23
 <211> 849
 <212> PRT
 <213> Human immunodeficiency virus

<400> 23

Met Arg Val Met Gly Ile Leu Lys Asn Tyr Gln Gln Trp Trp Met Trp
 1 5 10 15

Gly Ile Leu Gly Phe Trp Met Leu Ile Ile Ser Ser Val Val Gly Asn
 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys

35	40	45
Thr Thr Leu Phe Cys Thr Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val		
50	55	60
His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro		
65	70	75
		80
Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys		
	85	90
		95
Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp		
	100	105
		110
Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu		
	115	120
		125
Lys Cys Arg Asn Val Asn Ala Thr Asn Asn Ile Asn Ser Met Ile Asp		
	130	135
		140
Asn Ser Asn Lys Gly Glu Met Lys Asn Cys Ser Phe Asn Val Thr Thr		
	145	150
		155
		160
Glu Leu Arg Asp Arg Lys Gln Glu Val His Ala Leu Phe Tyr Arg Leu		
	165	170
		175
Asp Val Val Pro Leu Gln Gly Asn Asn Ser Asn Glu Tyr Arg Leu Ile		
	180	185
		190
Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe		
	195	200
		205
Asp Pro Ile Pro Ile His Tyr Cys Thr Pro Ala Gly Tyr Ala Ile Leu		
	210	215
		220
Lys Cys Asn Asn Gln Thr Phe Asn Gly Thr Gly Pro Cys Asn Asn Val		
	225	230
		235
		240
Ser Ser Val Gln Cys Ala His Gly Ile Lys Pro Val Val Ser Thr Gln		
	245	250
		255
Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Glu Ile Ile Ile Arg Ser		
	260	265
		270

Glu Asn Leu Ala Asn Asn Ala Lys Ile Ile Ile Val Gln Leu Asn Lys
275 280 285

Pro Val Lys Ile Val Cys Val Arg Pro Asn Asn Asn Thr Arg Lys Ser
290 295 300

Val Arg Ile Gly Pro Gly Gln Thr Phe Tyr Ala Thr Gly Glu Ile Ile
305 310 315 320

Gly Asp Ile Arg Gln Ala Tyr Cys Ile Ile Asn Lys Thr Glu Trp Asn
325 330 335

Ser Thr Leu Gln Gly Val Ser Lys Lys Leu Glu Glu His Phe Ser Lys
340 345 350

Lys Ala Ile Lys Phe Glu Pro Ser Ser Gly Gly Asp Leu Glu Ile Thr
355 360 365

Thr His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asp Thr Ser
370 375 380

Gln Leu Phe Asn Ser Thr Tyr Ser Pro Ser Phe Asn Gly Thr Glu Asn
385 390 395 400

Lys Leu Asn Gly Thr Ile Thr Ile Thr Cys Arg Ile Lys Gln Ile Ile
405 410 415

Asn Met Trp Gln Lys Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala
420 425 430

Gly Asn Leu Thr Cys Glu Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg
435 440 445

Asp Gly Gly Lys Thr Gly Pro Asn Asp Thr Glu Ile Phe Arg Pro Gly
450 455 460

Gly Gly Asp Met Arg Asp Asn Trp Arg Asn Glu Leu Tyr Lys Tyr Lys
465 470 475 480

Val Val Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Glu Ala Lys Arg
485 490 495

Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe
 500 505 510

Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile
 515 520 525

Thr Leu Thr Val Gln Ala Arg Leu Leu Leu Ser Gly Ile Val Gln Gln
 530 535 540

Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
 545 550 555 560

Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Thr Arg Ile Leu Ala Val
 565 570 575

Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser
 580 585 590

Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser
 595 600 605

Asn Arg Ser His Asp Glu Ile Trp Asp Asn Met Thr Trp Met Gln Trp
 610 615 620

Asp Arg Glu Ile Asn Asn Tyr Thr Asp Thr Ile Tyr Arg Leu Leu Glu
 625 630 635 640

Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu Leu Ala Leu
 645 650 655

Asp Ser Trp Gln Asn Leu Trp Asn Trp Phe Ser Ile Thr Asn Trp Leu
 660 665 670

Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu
 675 680 685

Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly
 690 695 700

Tyr Ser Pro Leu Pro Phe Gln Thr Leu Thr Pro Asn Pro Arg Glu Pro
 705 710 715 720

Asp Arg Leu Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Gly
725 730 735

Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp
740 745 750

Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile
755 760 765

Leu Ile Ala Ala Arg Val Leu Glu Leu Leu Gly Gln Arg Gly Trp Glu
770 775 780

Ala Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu Glu Leu
785 790 795 800

Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Ala Val Ala
805 810 815

Glu Gly Thr Asp Arg Ile Ile Glu Phe Ile Gln Arg Ile Cys Arg Ala
820 825 830

Ile Arg Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Ala Ala Leu
835 840 845

Gln

<210> 24
<211> 855
<212> PRT
<213> Human immunodeficiency virus

<400> 24

Met Arg Val Arg Gly Ile Leu Arg Ser Trp Gln Gln Trp Trp Ile Trp
1 5 10 15

Gly Ile Leu Gly Phe Trp Ile Cys Ser Gly Leu Gly Asn Leu Trp Val
20 25 30

Thr Val Tyr Asp Gly Val Pro Val Trp Arg Glu Ala Ser Thr Thr Leu
35 40 45

Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val His Asn Val
50 55 60

Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln Glu Ile
65 70 75 80

Glu Leu Asp Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asp Met
85 90 95

Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu
100 105 110

Lys Pro Arg Val Lys Leu Thr Pro Leu Cys Val Thr Leu Lys Cys Thr
115 120 125

Asn Tyr Ser Thr Asn Tyr Ser Asn Thr Met Asn Ala Thr Ser Tyr Asn
130 135 140

Asn Asn Thr Thr Glu Glu Ile Lys Asn Cys Thr Phe Asn Met Thr Thr
145 150 155 160

Glu Leu Arg Asp Lys Lys Gln Gln Val Tyr Ala Leu Phe Tyr Lys Leu
165 170 175

Asp Ile Val Pro Leu Asn Ser Asn Ser Ser Glu Tyr Arg Leu Ile Asn
180 185 190

Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Asp
195 200 205

Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys
210 215 220

Cys Lys Asn Asn Thr Ser Asn Gly Thr Gly Pro Cys Gln Asn Val Ser
225 230 235 240

Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Pro Leu
245 250 255

Leu Leu Asn Gly Ser Leu Ala Glu Gly Gly Glu Ile Ile Ile Arg Ser
260 265 270

Lys Asn Leu Ser Asn Asn Ala Tyr Thr Ile Ile Val His Leu Asn Asp
275 280 285

Ser Val Glu Ile Val Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Gly
 290 295 300

Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr Ala Thr Glu Asn Ile Ile
 305 310 315 320

Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Ala Gly Glu Trp Asn
 325 330 335

Lys Ala Val Gln Arg Val Ser Ala Lys Leu Arg Glu His Phe Pro Asn
 340 345 350

Lys Thr Ile Glu Phe Gln Pro Ser Ser Gly Gly Asp Leu Glu Ile Thr
 355 360 365

Thr His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser
 370 375 380

Lys Leu Phe Asn Ser Ser Tyr Asn Gly Thr Ser Tyr Arg Gly Thr Glu
 385 390 395 400

Ser Asn Ser Ser Ile Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile
 405 410 415

Asp Met Trp Gln Lys Val Gly Arg Ala Ile Tyr Ala Pro Pro Ile Glu
 420 425 430

Gly Asn Ile Thr Cys Ser Ser Ser Ile Thr Gly Leu Leu Leu Ala Arg
 435 440 445

Asp Gly Gly Leu Asp Asn Ile Thr Thr Glu Ile Phe Arg Pro Gln Gly
 450 455 460

Gly Asp Met Lys Asp Asn Trp Arg Asn Glu Leu Tyr Lys Tyr Lys Val
 465 470 475 480

Val Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Glu Ala Lys Arg Arg
 485 490 495

Val Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Ile Phe
 500 505 510

Gly Phe Leu Gly Ala Ala Gly Ser Asn Met Gly Ala Ala Ser Ile Thr
 515 520 525

Leu Thr Ala Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln
 530 535 540

Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu
 545 550 555 560

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu
 565 570 575

Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly
 580 585 590

Lys Leu Ile Cys Thr Thr Thr Val Pro Trp Asn Ser Ser Trp Ser Asn
 595 600 605

Lys Thr Gln Gly Glu Ile Trp Glu Asn Met Thr Trp Met Gln Trp Asp
 610 615 620

Lys Glu Ile Ser Asn Tyr Thr Gly Ile Ile Tyr Arg Leu Leu Glu Glu
 625 630 635 640

Ser Gln Asn Gln Gln Glu Gln Asn Glu Lys Asp Leu Leu Ala Leu Asp
 645 650 655

Ser Arg Asn Asn Leu Trp Ser Trp Phe Asn Ile Ser Asn Trp Leu Trp
 660 665 670

Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg
 675 680 685

Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr
 690 695 700

Ser Pro Leu Ser Phe Gln Thr Leu Thr Pro Asn Pro Arg Gly Leu Asp
 705 710 715 720

Arg Leu Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg
 725 730 735

Ser Ile Arg Leu Val Gln Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu

<212> PRT
 <213> Human immunodeficiency virus
 <400> 27
 Asp Ile Arg Gln Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg
 1 5 10 15
 Phe Phe Lys Thr
 20
 <210> 28
 <211> 47
 <212> PRT
 <213> Human immunodeficiency virus
 <400> 28
 Thr Ile Thr Ile Thr Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln
 1 5 10 15
 Lys Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Leu Thr
 20 25 30
 Cys Glu Ser Asn Ile Thr Gly Leu Leu Thr Arg Asp Gly Gly
 35 40 45
 <210> 29
 <211> 48
 <212> PRT
 <213> Human immunodeficiency virus
 <400> 29
 Ser Ile Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asp Met Trp
 1 5 10 15
 Gln Lys Val Gly Arg Ala Ile Tyr Ala Pro Pro Ile Glu Gly Asn Ile
 20 25 30
 Thr Cys Ser Ser Ser Ile Thr Gly Leu Leu Leu Ala Arg Asp Gly Gly
 35 40 45
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 <211> 2469
 <212> DNA
 <213> Artificial
 <220>

<223> PR975 (+)

<400> 30

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cacatcgccc gcaactgccg cgccccccgc aagaagggct gctggaagtg cggcaaggag	180
ggccaccaga tgaaggactg caccgagcgc caggccaact tcttccgcga ggacctggcc	240
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ggtgaattc						2469

<210> 31
 <211> 2463
 <212> DNA
 <213> Artificial

<220>
 <223> PR975YM

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tgcttttcgc ctgtactggg tctctctagg tagaccagat ctgagcccgg gagctctctg	9600
gctatctagg gaaccactg cttaagcctc aataaagctt gccttgagtg ccttgagtag	9660
tgtgtgcccc tctgttgtgt gactctggta actagagatc cctcagacca cttgtggtag	9720

tgtggaaaat ctctagca 9738

<210> 46
<211> 97
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Env Optimized common region short

<400> 46
catcaccctg cagtgaaga tcaagcagat cgtgcgcatg tggcagggcg tgggccaggc 60
catgtacgcc ccccccatcg ccggcaacat cacctgc 97

<210> 47
<211> 144
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Env Optimized common region

<400> 47
ctgcccata cctgcagtg caagatcaag cagatcgtgc gcatgtggca gggcgtgggc 60
caggccatgt acgccccccc catcgccggc aacatcacct gccgcagcaa catcaccggc 120
atcctgctga cccgcgacgg cggc 144

<210> 48
<211> 144
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Env wild type common region

<400> 48
ttacccatca cactccaatg caaaataaaa caaattgtac gcatgtggca aggggtagga 60
caagcaatgt atgcccctcc cattgcagga aacataacat gtagatcaaa catcacagga 120
atactattga cacgtgatgg ggga 144

<210> 49
<211> 2610
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Env gp160 optimized

<400> 49

atgcgcggtga	tgggacacca	gaagaactgc	cagcagtggg	ggatctgggg	catcctgggc	60
ttctggatgc	tgatgatctg	caacaccgag	gacctgtggg	tgaccgtgta	ctacggcgtg	120
cccgtgtggc	gcgaggccaa	gaccaccctg	ttctgcgcca	gcgacgccaa	ggcctacgag	180
accgaggtgc	acaacgtgtg	ggccaccac	gcctgcgtgc	ccaccgaccc	caacccccag	240
gagatcgtgc	tgggcaacgt	gaccgagaac	ttcaacatgt	ggaagaacaa	catggccgac	300
cagatgcacg	aggacatcat	cagcctgtgg	gaccagagcc	tgaagccctg	cgtgaagctg	360
acccccctgt	gcgtgaccct	gaactgcacc	gacaccaacg	tgaccggcaa	ccgcaccgtg	420
accggcaaca	ccaacgacac	caacatcgcc	aacgccacct	acaagtacga	ggagatgaag	480
aactgcagct	tcaacgccac	caccgagctg	cgcgacaaga	agcacaagga	gtacgccctg	540
ttctacaagc	tggacatcgt	gccccctgaac	gagaacagca	acaacttcac	ctaccgcctg	600
atcaactgca	acaccagcac	catcacccag	gcctgccccca	aggtgagctt	cgacccccatc	660
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gccttctacg	ccaccaacga	cgtgatcggc	aacatccgcc	aggcccaactg	caacatcagc	1020
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aagaacgaga aggacctgct ggagctggac aagtggaaca acctgtggaa ctggttcgac	2040
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ctgcgcatca tcttcgccgt gctgagcatc gtgaaccgcg tgcgccaggg ctacagcccc	2160
ctgagcttcc agacctgac cccagcccc cgcgccctgg accgcctggg cggcatcgag	2220
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cgcggtctgg agatcctgaa gtacctgggc agcctggtgc agtactgggg cctggagctg	2460
aagaagagcg ccatcagccc cctggacacc atcgccatcg ccgtggccga gggcaccgac	2520
cgcacatcg agctggtgca gcgcacatgc cgcgccatcc tgaacatccc ccgccgcatc	2580
cgccaggggt tcgaggccgc cctgctgtaa	2610

<210> 50
 <211> 2610
 <212> DNA
 <213> Artificial

<220>
 <223> Type C Envgp160 wild type

<400> 50	
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ttctggatgc taatgatttg taacacggag gacttgtggg tcacagtcta ctatggggta	120
cctgtgtgga gagaagcaaa aactactcta ttctgtgcat cagatgctaa agcatatgag	180
acagaagtgc ataatgtctg ggctacacat gcttgtgtac ccacagacct caaccacaaa	240
gaaatagttt tgggaaatgt aacagaaaat tttaatatgt ggaaaaataa catggcagat	300
cagatgcatg aggatataat cagtttatgg gatcaaagcc taaagccatg tgtaaagttg	360
acccactct gtgtcacttt aaactgtaca gatacaaatg ttacaggtaa tagaactgtt	420

acaggttaata caaatgatac caatattgca aatgctacat ataagtatga agaaatgaaa	480
aattgctctt tcaatgcaac cacagaatta agagataaga aacataaaga gtatgcactc	540
ttttataaac ttgatatagt accacttaat gaaaatagta acaactttac atatagatta	600
ataaattgca atacctcaac cataacacaa gcctgtccaa aggtctcttt tgacccgatt	660
cctatacatt actgtgctcc agctgattat gcgattctaa agtgtaataa taagacattc	720
aatgggacag gaccatgtta taatgtcagc acagtacaat gtacacatgg aattaagcca	780
gtggtatcaa ctcaactact gttaaattgg agtctagcag aagaagggat aataattaga	840
tctgaaaatt tgacagagaa taccaaaaca ataatagtac atcttaatga atctgtagag	900
attaattgta caaggcccaa caataatata aggaaaagtg taaggatagg accaggacaa	960
gcattctatg caacaaatga cgtaatagga aacataagac aagcacattg taacattagt	1020
acagatagat ggaataaaac tttaacaacag gtaatgaaaa aattaggaga gcatttcctt	1080
aataaaacaa taaaatttga accacatgca ggaggggagc tagaaattac aatgcatagc	1140
tttaattgta gaggagaatt tttctattgc aatacatcaa acctgtttaa tagtacatac	1200
taccctaaga atggtacata caaatacaat ggtaattcaa gcttaccat cacactccaa	1260
tgcaaaataa aacaaattgt acgcatgtgg caaggggtag gacaagcaat gtatgccctt	1320
cccattgcag gaaacataac atgtagatca aacatcacag gaatactatt gacacgtgat	1380
gggggattta acaacacaaa caacgacaca gaggagacat tcagacctgg aggaggagat	1440
atgagggata actggagaag tgaattatat aaatataaag tggtagaaat taagccattg	1500
ggaatagcac ccactaaggc aaaaagaaga gtggtgcaga gaaaaaaaag agcagtggga	1560
ataggagctg tgttccttgg gttcttggga gcagcaggaa gcactatggg cgcagcgtca	1620
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ttgctgaagg ctatagaggc gcaacagcat atgttgcaac tcacagtctg gggcattaag	1740
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attaataatt acacagaaac aatattcagg ttgcttgaag actcgcaaaa ccagcaggaa	1980
aagaatgaaa aagatttatt agaattggac aagtggaata atctgtggaa ttggtttgac	2040
atatcaaact ggctgtggta tataaaaata ttcataatga tagtaggagg cttgataggt	2100
ttaagaataa tttttgctgt gctctctata gtgaatagag ttaggcaggg atactcacct	2160

ttgtcatttc agacccttac cccaagcccg aggggactcg acaggctcgg aggaatcgaa	2220
gaagaagggtg gagagcaaga cagagacaga tccatacgat tggtagcgcg attcttgtcg	2280
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aggggggtggg agatccttaa gtatctggga agtcttgtgc agtattgggg tctagagcta	2460
aaaaagagtg ctattagtcc gcttgatacc atagcaatag cagtagctga aggaacagat	2520
aggattatag aattggtaca aagaatttgt agagctatcc tcaacatacc taggagaata	2580
agacagggct ttgaagcagc tttgctataa	2610

<210> 51
 <211> 1494
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Gag optimized

<400> 51	
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ctgcgccccg gcggaagaa gcactacatg ctgaagcacc tggtaggggc cagccgag	120
ctggagcgct tcgccctgaa ccccgccctg ctggagacca gcgagggctg caagcagatc	180
atcaagcagc tgcagccgc cctgcagacc ggcaccgagg agctgcgcag cctgttcaac	240
accgtggcca ccctgtactg cgtgcacaag ggcacgcagg tgcgcgacac caaggaggcc	300
ctggacaaga tcgaggagga gcagaacaag tgccagcaga agggccagca ggccaaggcc	360
gccgacgaga aggtgagcca gaactacccc atcgtgcaga acggccaggg ccagatggtg	420
caccaggcca tcagcccccg caccctgaac gcctggatca aggtgatcga ggagaaggcc	480
ttcaacccccg aggagatccc catgttcacc gccctgagcg agggcgccac ccccaggac	540
ctgaacacca tgctgaacac cgtgggcggc caccaggccg ccatgcagat gctgaaggac	600
accatcaacg aggaggccgc cgagtgggac cgcacccacc ccgtgcacgc cggccccgtg	660
gccccggcc agatgcgcga gccccgggc agcgacatcg ccggcaccac cagcaccctg	720
caggagcaga tcgctggat gaccagcaac cccccatcc ccgtggagga catctacaag	780
cgctggatca tcctgggcct gaacaagatc gtgcgcagtgt acagccccgt gagcatcctg	840
gacatcaagc agggccccaa ggagcccttc cgcgactacg tggaccgctt cttcaagacc	900

ctgcgcgccg agcaggccac ccaggacgtg aagaactgga tgaccgacac cctgctggtg	960
cagaacgcca accccgactg caagaccatc ctgcgcgccc tgggcccccg cgccagcctg	1020
gaggagatga tgaccgcctg ccagggcgtg ggcgggcccca gccacaaggc ccgcgtgctg	1080
gccgaggcca tgagccaggc caacagcaac atcctggtgc agcgcagcaa cttcaagggc	1140
agcaaccgca tcatcaagtg cttcaactgc ggcaagggtg gccacatcgc ccgcaactgc	1200
cgcgcccccc gcaagaaggg ctgctggaag tgcggccagg agggccacca gatgaaggac	1260
tgcaccgagc gccaggccaa cttcctgggc aagatctggc ccagccacaa gggccgcccc	1320
ggcaacttcc tgcagaaccg ccccgagccc accgcccccc ccgcccagcc caccgcccc	1380
cccgcgaga gtttccgctt cgaggagacc acccccgtgc cccgcaagga gaaggagcgc	1440
gagcccctga ccagcctgaa gagcctgttc ggcagcgacc ccctgagcca gtaa	1494

<210> 52
 <211> 1494
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Gag Wild Type

<400> 52	
atgggtgcga gagcgtcaat attaagcggc ggaaaattag ataaatggga aagaattagg	60
ttaaggccag ggggaaagaa acattatatg ttaaaacatc tagtatgggc aagcaggag	120
ctggaaagat ttgcacttaa ccctggcctg ttagaaacat cagaaggctg taaacaaata	180
ataaaacagc tacaaccagc tcttcagaca ggaacagagg aacttagatc attattcaac	240
acagtagcaa ctctctattg tgtacataaa gggatagagg tacgagacac caaggaagcc	300
ttagacaaga tagaggaaga acaaaacaaa tgtcagcaaa aagcacaaca ggcaaaagca	360
gctgacgaaa aggtcagtca aaattatcct atagtacaga atgccaagg gcaaattgta	420
caccaagcta tatcacctag aacattgaat gcatggataa aagtaataga ggaaaaggct	480
ttcaatccag aggaaatacc catgtttaca gcattatcag aaggagccac cccacaagat	540
ttaaacacaa tgttaaatac agtgggggga catcaagcag ccatgcaaat gttaaaagat	600
accatcaatg aggaggctgc agaatgggat aggacacatc cagtacatgc agggcctgtt	660
gcaccaggcc agatgagaga accaagggga agtgacatag caggaactac tagtaccctt	720
caggaacaaa tagcatggat gacaagtaat ccacctattc cagtagaaga catctataaa	780
agatggataa ttctgggggt aaataaaata gtaagaatgt atagccctgt tagcattttg	840

gacataaaac aagggccaaa agaacccttt agagactatg tagaccgggtt ctttaaaacc	900
ttaagagctg aacaagctac acaagatgta aagaattgga tgacagacac cttgttggtc	960
caaaatgcga acccagattg taagaccatt ttaagagcat taggaccagg ggcctcatta	1020
gaagaaatga tgacagcatg tcagggagtg ggaggaccta gccataaagc aagagtgttg	1080
gctgaggcaa tgagccaagc aaacagtaac atactagtgc agagaagcaa ttttaaaggc	1140
tctaacagaa ttattaaatg tttcaactgt ggcaaagtag ggcacatagc cagaaattgc	1200
agggccccta ggaaaaaggg ctgttggaat tgtggacagg aaggacacca aatgaaagac	1260
tgtactgaga ggcaggctaa ttttttaggg aaaatttggc cttcccacaa ggggaggcca	1320
gggaatttcc tccagaacag accagagcca acagccccac cagcagaacc aacagcccca	1380
ccagcagaga gcttcagggt cgaggagaca acccccgtgc cgaggaagga gaaagagagg	1440
gaacctttaa cttccctcaa atcactcttt ggcagcgacc ctttgtctca ataa	1494

<210> 53
 <211> 60
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Gag Major Homology Region Optimized

<400> 53	
gacatcaagc agggcccaaa ggagcccttc cgcgactacg tggaccgctt cttcaagacc	60

<210> 54
 <211> 60
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Gag Major Homology Region Wild Type

<400> 54	
gacataaaac aagggccaaa agaacccttt agagactatg tagaccgggtt ctttaaaacc	60

<210> 55
 <211> 624
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Nef Optimized

<400> 55

atgggaggca agtggagcaa ggcgagcatc gtgggctggc ccgccgtgcg cgagcgcacg	60
cgccgcaccg agcccgccgc cgagggcggtg ggcgccgcca gccaggacct ggaccgccac	120
ggcgccctga ccagcagcaa cccccccgcc accaacgagg cctgcgcctg gctgcaggcc	180
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acctacaaga ggcgcgtgga cctgagcttc ttctgaagg agaagggcgg cctggagggc	300
ctgatctaca gccgcaagcg ccaggagatc ctggacctgt ggggtgtaca caccaggggc	360
ttcttccccg actggcagaa ctacaccagc ggccccggcg tgcgcttccc cctgaccttc	420
ggctgggtgct tcaagctggt gcccggtggac ccccgcgagg tgaaggaggc caacgagggc	480
gaggacaact gcctgctgca ccccatgagc cagcacggcg ccgaggacga ggaccgcgag	540
gtgctgaagt ggaagttcga cagcctgctg gccaccgcc acatggcccc cgagctgcac	600
cccgagtact acaaggactg ctga	624

<210> 56
 <211> 624
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Nef Wild Type

<400> 56	
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agaagaactg agccagcagc agagggagta ggagcagcgt ctcaagactt agatagacat	120
ggggcactta caagcagcaa cacacctgct actaatgaag cttgtgcctg gctgcaagca	180
caagaggagg acggagatgt aggctttcca gtcagacctc aggtaccttt aagaccaatg	240
acttataaga gtgcagtaga tctcagcttc tttttaaaag aaaagggggg actggaaggg	300
ttaatttact ctaggaaaag gcaagaaatc cttgatttgt ggggtctataa cacacaaggc	360
ttcttccttg attggcaaaa ctacacatcg gggccagggg tccgattccc actgaccttt	420
ggatgggtgct tcaagctagt accagttgac ccaagggagg tgaaagaggc caatgaagga	480
gaagacaact gtttgctaca ccctatgagc caacatggag cagaggatga agatagagaa	540
gtattaaagt ggaagtttga cagccttcta gcacacagac acatggcccc cgagctacat	600
ccggagtatt acaaagactg ctga	624

<210> 57
 <211> 624

<212> DNA
 <213> Artificial

<220>
 <223> HIV Type C NefD125G Optimized

<400> 57
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 cgccgcaccg agcccgccgc cgaggggcgtg ggcgccgccca gccaggacct ggaccgccac 120
 ggcgcacctga ccagcagcaa cccccccgcc accaacgagg cctgcgcctg gctgcaggcc 180
 caggaggagg acggcgacgt gggcttcccc gtgcgcccc aggtgcccct gcgccccatg 240
 acctacaaga gcgcctgga cctgagcttc ttctgaagg agaagggcgg cctggagggc 300
 ctgatctaca gccgcaagcg ccaggagatc ctggacctgt ggggtgtacaa caccagggc 360
 ttcttccccg gctggcagaa ctacaccagc ggccccggcg tgcgcttccc cctgaccttc 420
 ggctgggtgct tcaagctggg gcccgaggac ccccgcgagg tgaaggaggc caacgagggc 480
 gaggacaact gcctgctgca ccccatgagc cagcacggcg ccgaggacga ggaccgcgag 540
 gtgctgaagt ggaagttcga cagcctgctg gccaccgcc acatggcccc cgagctgcac 600
 cccgagtact acaaggactg ctga 624

<210> 58
 <211> 354
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C p15RNaseH Optimized

<400> 58
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 accgaccgcg gccgccagaa gatcgtgacc ctgaccaaca ccaccaacca gaagaccgag 120
 ctgcaggcca tccagctggc cctgcaggac agcggcagcg aggtgaacat cgtgaccgac 180
 agccagtacg ccctgggcat catccaggcc cagcccgaca agagcgacag cgagatcttc 240
 aaccagatca tcgagcagct gatcaacaag gagcgcacat acctgagctg ggtgccccgc 300
 cacaagggca tcggcgggcaa cgagcagggtg gacaagctgg tgagcaaggg catc 354

<210> 59
 <211> 354
 <212> DNA
 <213> Artificial

<220>

<223> HIV Type C p15RNaseH Wild Type

<400> 59

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actgacagag gaaggcagaa aattgttact ctaactaaca caacaaatca gaagactgag	120
ttacaagcaa ttcagctagc tctgcaggat tcaggatcag aagtaaacad agtaacagac	180
tcacagtatg cattaggaat cattcaagca caaccagata agagtgactc agagatatatt	240
aaccaaataa tagaacagtt aataaacaag gaaagaatct acctgtcatg ggtaccagca	300
cataaaggaa ttggggggaaa tgaacaagta gataaattag taagtaaggg aatt	354

<210> 60

<211> 876

<212> DNA

<213> Artificial

<220>

<223> HIV Type C p31Int Optimized

<400> 60

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agcaactggc ggcgcctggc caacgagttc aacctgcccc ccatcggtggc caaggagatc	120
gtggccagct gcgacaagtg ccagctgaag ggcgaggcca tccacggcca ggtggactgc	180
agccccggca tctggcagct ggactgcacc cacctggagg gcaagatcat cctggtggcc	240
gtgcacgtgg ccagcggcta catggaggcc gaggtgatcc ccgccgagac cggccaggag	300
accgcctact tcacacctgaa gctggccggc cgctggcccc tgaaggtgat ccacaccgac	360
aacggcagca acttcaccag caccgcctg aaggccgcct gctggtgggc cggcatccag	420
caggagtctg gcatcccta caacccccag agccagggcg tggaggagag catgaacaag	480
gagctgaaga agatcatcgg ccaggtgccc gaccagggcg agcacctgaa gaccgccgtg	540
cagatggccg tgttcatcca caacttcaag cgcaagggcg gcatcggcgg ctacagcgcc	600
ggcgagcgca tcacgacat catcgccacc gacatccaga ccaaggagct gcagaagcag	660
atcatccgca tccagaactt ccgctgttac taccgcgaca gccgcgaccc catctggaag	720
ggccccgccg agctgctgtg gaagggcgag ggctggtgg tgatcgagga caagggcgac	780
atcaaggtgg tgccccgccg caaggccaag atcatccgag actacggcaa gcagatggcc	840
ggcgccgact gcgtggccgg cggccaggac gaggac	876

<210> 61
 <211> 876
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C p31Int Wild Type

<400> 61
 aggaaagtgt tgtttctaga tggaatagat aaagctcaag aagagcatga aaggtaccac 60
 agcaattgga gagcaatggc taatgagttt aatctgccac ccatagtagc aaaagaaata 120
 gtagctagct gtgataaatg tcagctaaaa ggggaagcca tacatggaca agtcgactgt 180
 agtccaggga tatggcaatt agattgtacc catttagagg gaaaaatcat cctggtagca 240
 gtccatgtag ctagtggcta catggaagca gaggttatcc cagcagaaac aggacaagaa 300
 acagcatatt ttatattaaa attagcagga agatggccag tcaaagtaat acatacagac 360
 aatggcagta attttaccag tactgcagtt aaggcagcct gttgggtgggc aggtatccaa 420
 caggaatttg gaattcccta caatcccca agtcagggag tggtagaatc catgaataaa 480
 gaattaaaga aaataatagg acaagtaaga gatcaagctg agcaccttaa gacagcagta 540
 caaatggcag tattcattca caattttaaa agaaaagggg gaattggggg gtacagtgca 600
 ggggaaagaa taatagacat aatagcaaca gacatacaaa ctaaagaatt acaaaaacaa 660
 attataagaa ttcaaaattt tcgggtttat tacagagaca gcagagaccc tatttggaaa 720
 ggaccagccg aactactctg gaaaggtgaa ggggtagtag taatagaaga taaaggtgac 780
 ataaaggtag taccaaggag gaaagcaaaa atcattagag attatggaaa acagatggca 840
 ggtgctgatt gtgtggcagg tggacaggat gaagat 876

<210> 62
 <211> 3015
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Pol Optimized

<400> 62
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 acccgcgcca acagccccac cagccgcacc aacagcccca ccagccgcga gctgcagggtg 120
 cgcggcgaca acccccgcgc cgaggagggc gagcgcgagg gcaccttcaa cttccccag 180
 atcacctgt ggcagcgccc cctggtgagc atcaaggtgg agggccagat caaggaggcc 240

ctgctggaca	ccggcgccga	cgacaccgtg	ctggaggaga	tcgacctgcc	cggcaagtgg	300
aagcccaaga	tgatcggcgg	catcggcggc	ttcatcaagg	tgcgccagta	cgaccagatc	360
ctgatcgaga	tctgcggcaa	gaaggccatc	ggcaccgtgc	tgggtgggccc	cacccccgtg	420
aacatcatcg	gocgcaacct	gctgacccag	ctgggctgca	ccctgaactt	ccccatcagc	480
cccatcgaga	ccgtgcccgt	gaagctgaag	cccggcatgg	acggccccaa	ggtgaagcag	540
tggcccctga	ccgaggagaa	gatcaaggcc	ctgaccgcca	tctgcgagga	gatggagaag	600
gagggcaaga	tcaccaagat	cggccccgac	aacccctaca	acacccccgt	gttcgccatc	660
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ttccgcaagt	acaccgcctt	caccatcccc	agcatcaaca	acgagacccc	cggcatccgc	900
taccagtaca	acgtgctgcc	ccagggtctg	aagggcagcc	ccgccatctt	ccagagcagc	960
atgaccaaga	tcctggagcc	cttccgcgcc	aagaaccccg	acatcgtgat	ctaccagtac	1020
atggacgacc	tgtacgtggg	cagcgacctg	gagatcggcc	agcacccgcgc	caagatcgag	1080
gagctgcgcg	agcacctgct	gaagtggggc	ttcaccaccc	ccgacaagaa	gcaccagaag	1140
gagccccct	tcctgtggat	gggctacgag	ctgcaccccg	acaagtggac	cgtgcagccc	1200
atcctgctgc	ccgagaagga	cagctggacc	gtgaacgaca	tccagaagct	ggtgggcaag	1260
ctgaactggg	ccagccagat	ctacccccgc	atcaagggtg	gccagctgtg	caagctgctg	1320
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gccgagaacc	gcgagatcct	gcgcgagccc	gtgcacggcg	tgtactacga	ccccagcaag	1440
gacctgatcg	ccgagatcca	gaagcagggc	cacgagcagt	ggacctacca	gatctaccag	1500
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gactactggc	aggccacctg	gatccccgag	tgggagtctg	tgaacacccc	ccccctggtg	1740
aagctgtggt	accagctgga	gaaggacccc	atcgccggcg	tggagacctt	ctacgtggac	1800
ggcgccacca	accgcgaggc	caagatcggc	aaggccggct	acgtgaccga	ccgcggccgc	1860
cagaagatcg	tgacctgac	caacaccacc	aaccagaaga	ccgagctgca	ggccatccag	1920
ctggccctgc	aggacagcgg	cagcgagggtg	aacatcgtga	ccgacagcca	gtacgccctg	1980

ggcatcatcc	aggcccagcc	cgacaagagc	gacagcgaga	tcttcaacca	gatcatcgag	2040
cagctgatca	acaaggagcg	catctacctg	agctgggtgc	ccgcccacaa	gggcatcggc	2100
ggcaacgagc	aggtggacaa	gctggtgagc	aaggggcatcc	gcaaggtgct	gttcctggac	2160
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aacgagttca	acctgcccc	catcgtggcc	aaggagatcg	tggccagctg	cgacaagtgc	2280
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aacccccaga	gccaggggcgt	ggtggagagc	atgaacaagg	agctgaagaa	gatcatcggc	2640
caggtgcgcg	accaggccga	gcacctgaag	accgccgtgc	agatggccgt	gttcatccac	2700
aacttcaagc	gcaagggcgg	catcggcggc	tacagcgccg	gcgagcgcat	catcgacatc	2760
atcgccaccg	acatccagac	caaggagctg	cagaagcaga	tcatccgcat	ccagaacttc	2820
cgcggtgtact	accgcgacag	ccgcgacccc	atctggaagg	gccccgccga	gctgctgtgg	2880
aagggcgagg	gcgtggtggt	gatcgaggac	aagggcgaca	tcaaggtggt	gccccgccgc	2940
aaggccaaga	tcatccgcga	ctacggcaag	cagatggccg	gcgccgactg	cgtggccggc	3000
ggccaggacg	aggac					3015

<210> 63
 <211> 3015
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Pol Wild Type

<400>	63	
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accagagcca	acagccccac	cagcagaacc aacagcccca ccagcagaga gcttcaggtt 120
cgaggagaca	acccccgtgc	cgaggaagga gaaagagagg gaaccttta cttccctcaa 180
atcactcttt	ggcagcgacc	ccttgtctca ataaaagtag agggccagat aaaggaggct 240
ctcttagaca	caggagcaga	tgatacagta ttagaagaaa tagatttgcc agggaaatgg 300

aaacccaaaa	tgataggggg	aattggaggt	tttatcaaag	taagacagta	tgatcaaata	360
cttatagaaa	tttgtggaaa	aaaggctata	ggtacagtat	tagtagggcc	tacaccagtc	420
aacataattg	gaagaaatct	gttaactcag	cttggatgca	cactaaatth	tccaattagt	480
cctattgaaa	ctgtaccagt	aaaattaaaa	ccaggaatgg	atggcccaaa	ggtcaaacaa	540
tggccattga	cagaagaaaa	aataaaagca	ttaacagcaa	tttgtgagga	aatggagaag	600
gaaggaaaaa	ttacaaaaat	tgggcctgat	aatccatata	acactccagt	atttgccata	660
aaaaagaagg	acagtactaa	gtggagaaaa	ttagtagatt	tcagggaact	caataaaaga	720
actcaagact	tttgggaagt	tcaattagga	ataccacacc	cagcaggatt	aaaaaagaaa	780
aatcagtga	cagtgcctaga	tgtgggggat	gcatatthth	cagttcctth	agatgaaagc	840
ttcaggaaat	atactgcatt	caccatacct	agtataaaca	atgaaacacc	agggattaga	900
tatcaatata	atgtgctgcc	acagggatgg	aaaggatcac	cagcaatatt	ccagagtagc	960
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atggatgact	tgtatgtagg	atctgactta	gaaatagggc	aacatagagc	aaaaatagaa	1080
gagttaaggg	aacatthtatt	gaaatggggg	tttacaacac	cagacaagaa	acatcaaaaa	1140
gaacccccat	ttctthtgat	gggggatgaa	ctccatcctg	acaaatggac	agtacaacct	1200
atactgctgc	cagaaaagga	tagttggact	gtcaatgata	tacagaagtt	agtgggaaaa	1260
ttaaaactggg	caagtcagat	ttaccagggg	attaaagtaa	ggcaactctg	taaactcctc	1320
agggggggcca	aagcactaac	agacatagta	ccactaactg	aagaagcaga	attagaattg	1380
gcagagaaca	gggaaattht	aagagaacca	gtacatggag	tatattatga	tccatcaaaa	1440
gacttgatag	ctgaaataca	gaaacagggg	catgaacaat	ggacatatca	aatthtatcaa	1500
gaaccattta	aaaatctgaa	aacaggggaag	tatgcaaaaa	tgaggactac	ccacactaat	1560
gatgtaaaac	agttaacaga	ggcagtgcaa	aaaatagcca	tggaaagcat	agtaatatgg	1620
ggaaagactc	ctaaatthtag	actaccatc	caaaaagaaa	catgggagac	atggtggaca	1680
gactattggc	aagccacctg	gatccctgag	tgggagthtg	ttaatacccc	tcccctagta	1740
aaattatgg	accaactaga	aaaagatccc	atagcaggag	tagaaactth	ctatgtagat	1800
ggagcaacta	atagggaagc	taaaatagga	aaagcaggg	atgttactga	cagaggaagg	1860
cagaaaattg	ttactctaac	taacacaaca	aatcagaaga	ctgagttaca	agcaattcag	1920
ctagctctgc	aggattcagg	atcagaagta	aacatagtaa	cagactcaca	gtatgcatta	1980
ggaatcatte	aagcacaacc	agataagagt	gactcagaga	tatttaacca	aataatagaa	2040

cagttaataa acaaggaaag aatctacctg tcatgggtac cagcacataa aggaattggg	2100
ggaaatgaac aagtagataa attagtaagt aagggaatta ggaaagtgtt gtttctagat	2160
ggaatagata aagctcaaga agagcatgaa aggtaccaca gcaattggag agcaatggct	2220
aatgagttta atctgccacc catagtagca aaagaaatag tagctagctg tgataaatgt	2280
cagctaaaag gggaagccat acatggacaa gtcgactgta gtccagggat atggcaatta	2340
gattgtaccc atttagaggg aaaaatcatc ctggtagcag tccatgtagc tagtggctac	2400
atggaagcag aggttatccc agcagaaaca ggacaagaaa cagcatattt tatattaaaa	2460
ttagcaggaa gatggccagt caaagtaata catacagaca atggcagtaa ttttaccagt	2520
actgcagtta aggcagcctg ttggtgggca ggtatccaac aggaatttgg aattccctac	2580
aatccccaaa gtcagggagt ggtagaatcc atgaataaag aattaaagaa aataatagga	2640
caagtaagag atcaagctga gcaccttaag acagcagtac aaatggcagt attcattcac	2700
aattttaaaa gaaaaggggg aattgggggg tacagtgcag gggaaagaat aatagacata	2760
atagcaacag acatacaaac taaagaatta caaaaacaaa ttataagaat tcaaaatttt	2820
cgggtttatt acagagacag cagagacctt atttggaaag gaccagccga actactctgg	2880
aaaggtgaag gggtagtagt aatagaagat aaaggtgaca taaaggtagt accaaggagg	2940
aaagcaaaaa tcattagaga ttatggaaaa cagatggcag gtgctgattg tgtggcaggt	3000
ggacaggatg aagat	3015

<210> 64
 <211> 297
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Protease Optimized

<400> 64	
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gaggccctgc tggacaccgg cgccgacgac accgtgctgg aggagatcga cctgcccggc	120
aagtggaagc ccaagatgat cggcggcatc ggcggttca tcaaggtgcg ccagtacgac	180
cagatcctga tcgagatctg cggcaagaag gccatcggca ccgtgctggt gggccccacc	240
cccgtgaaca tcatcgggcg caacctgctg acccagctgg gctgcaccct gaacttc	297

<210> 65

<211> 297
 <212> DNA
 <213> Artificial

 <220>
 <223> HIV Type C Protease Wild Type

 <400> 65
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 gaggtctctt tagacacagg agcagatgat acagtattag aagaaataga tttgccaggg 120
 aaatggaaac caaaaatgat agggggaatt ggaggtttta tcaaagtaag acagtatgat 180
 caaatactta tagaaatttg tggaaaaaag gctataggta cagtattagt agggcctaca 240
 ccagtcaaca taattggaag aaatctgtta actcagcttg gatgcacact aaatttt 297

 <210> 66
 <211> 297
 <212> DNA
 <213> Artificial

 <220>
 <223> HIV Type C Inactivated Protease Optimized

 <400> 66
 cccagatca cctgtggca ggcacctg gtgagcatca aggtggaggg ccagatcaag 60
 gaggccctgc tggccaccgg cgccagcagc accgtgctgg aggagatcga cctgcccggc 120
 aagtggaagc ccaagatgat cggcggcatc ggcggcttca tcaaggtgcg ccagtacgac 180
 cagatcctga tcgagatctg cggcaagaag gccatcggca ccgtgctggg gggccccacc 240
 cccgtgaaca tcatcgccg caacctgctg acccagctgg gctgcaccct gaacttc 297

 <210> 67
 <211> 297
 <212> DNA
 <213> Artificial

 <220>
 <223> HIV Type C Inactivated Protease Wild Type

 <400> 67
 cctcaaatca ctctttggca gcgaccctt gtctcaataa aagtagaggg ccagataaag 60
 gaggtctctt tagccacagg agcagatgat acagtattag aagaaataga tttgccaggg 120
 aaatggaaac caaaaatgat agggggaatt ggaggtttta tcaaagtaag acagtatgat 180
 caaatactta tagaaatttg tggaaaaaag gctataggta cagtattagt agggcctaca 240
 ccagtcaaca taattggaag aaatctgtta actcagcttg gatgcacact aaatttt 297

<210> 68
 <211> 1965
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Inactivated Protease Mutated Reverse Transcriptase
 Optimized

<400> 68
 cccagatca ccctgtggca gcgccccctg gtgagcatca aggtggaggg ccagatcaag 60
 gaggcctgc tggccaccgg cgccgacgac accgtgctgg aggagatcga cctgcccggc 120
 aagtggaagc ccaagatgat cggcggcatc ggcggttca tcaaggtgcy ccagtacgac 180
 cagatcctga tcgagatctg cggcaagaag gccatcggca ccgtgctggt gggccccacc 240
 cccgtgaaca tcacggccg caacctgctg acccagctgg gctgcaccct gaacttcccc 300
 atcagcccca tcgagaccgt gcccgtaag ctgaagcccg gcatggacgg ccccaaggtg 360
 aagcagtggc ccctgaccga ggagaagatc aaggccctga ccgccatctg cgaggagatg 420
 gagaaggagg gcaagatcac caagatcggc cccgacaacc cctacaacac ccccggtgttc 480
 gccatcaaga agaaggacag caccaagtgg cgcaagctgg tggacttccg cgagctgaac 540
 aagcgcaccc aggacttctg ggaggtgcag ctgggcatcc cccaccccg cggcctgaag 600
 aagaagaaga gcgtgaccgt gctggacgtg ggcgacgcct acttcagcgt gcccctggac 660
 gagagcttcc gcaagtacac cgccttcacc atccccagca tcaacaacga gacccccggc 720
 atccgctacc agtacaacgt gctgccccag ggctggaagg gcagccccgc catcttccag 780
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 aaccgcgaga tcctgcgcga gcccgtcac ggcggtgtact acgaccccg caaggacctg 1260
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aagcagctga ccgaggccgt gcagaagatc gccatggaga gcatcgtgat ctggggcaag	1440
accccccaagt tccgcctgcc catccagaag gagacctggg agacctggtg gaccgactac	1500
tggcaggcca cctggatccc cgagtgggag ttcgtgaaca cccccccct ggtgaagctg	1560
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accaaccgcg aggccaagat cggcaaggcc ggctacgtga ccgaccgagg ccgccagaag	1680
atcgtgaccc tgaccaacac caccaaccag aagaccgagc tgcaggccat ccagctggcc	1740
ctgcaggaca gcggcagcga ggtgaacatc gtgaccgaca gccagtacgc cctgggcatc	1800
atccaggccc agcccgacaa gagcgacagc gagatcttca accagatcat cgagcagctg	1860
atcaacaagg agcgcatcta cctgagctgg gtgcccggcc acaagggcat cggcggcaac	1920
gagcaggtgg acaagctggg gagcaagggc atccgcaagg tgctg	1965

<210> 69
 <211> 1965
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Inactivated Protease Mutated Reverse Transcriptase
 Wild Type

<400> 69	
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aaatggaaac caaaaatgat agggggaatt ggaggtttta tcaaagtaag acagtatgat	180
caaatactta tagaaatttg tggaaaaaag gctataggta cagtattagt agggcctaca	240
ccagtcaaca taattggaag aaatctgtta actcagcttg gatgcacact aaattttcca	300
attagtccta ttgaaactgt accagtaaaa ttaaaaccag gaatggatgg cccaaaggtc	360
aaacaatggc cattgacaga agaaaaata aaagcattaa cagcaatttg tgaggaaatg	420
gagaaggaag gaaaaattac aaaaattggg cctgataatc catataacac tccagtattt	480
gccataaaaa agaaggacag tactaagtgg agaaaattag tagatttcag ggaactcaat	540
aaaagaactc aagacttttg ggaagttcaa ttaggaatac cacaccagc aggattaaaa	600
aagaaaaaat cagtgacagt gctagatgtg ggggatgcat atttttcagt tcctttagat	660
gaaagcttca ggaaatatac tgcattcacc atacctagta taaacaatga aacaccaggg	720
attagatata aatataatgt gctgccacag ggatggaaag gatcaccagc aatattccag	780

agtagcatga caaaaatcctt agagcccttc agagcaaaaa atccagacat agttatctat	840
caagccccgt tgtatgtagg atctgactta gaaatagggc aacatagagc aaaaatagaa	900
gagttaaggg aacattttatt gaaatgggga tttaacaacac cagacaagaa acatcaaaaa	960
gaacccccat ttcttcccat cgaactccat cctgacaaat ggacagtaca acctatactg	1020
ctgccagaaa aggatagttg gactgtcaat gatatacaga agttagtggg aaaattaaac	1080
tgggcaagtc agattttacc agggattaaa gtaaggcaac tctgtaaact cctcaggggg	1140
gccaaagcac taacagacat agtaccacta actgaagaag cagaattaga attggcagag	1200
aacagggaaa ttttaagaga accagtacat ggagtatatatt atgatccatc aaaagacttg	1260
atagctgaaa tacagaaaca ggggcatgaa caatggacat atcaaattta tcaagaacca	1320
tttaaaaaatc tgaaaacagg gaagtatgca aaaatgagga ctaccacacac taatgatgta	1380
aaacagttaa cagaggcagt gcaaaaaata gccatggaaa gcatagtaat atgggggaaag	1440
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tggcaagcca cctggatccc tgagtgggag tttgttaata cccctcccct agtaaaatta	1560
tggtaccaac tagaaaaaga tcccatagca ggagtagaaa ctttctatgt agatggagca	1620
actaataggg aagctaaaat aggaaaagca gggatatgta ctgacagagg aaggcagaaa	1680
attgttactc taactaacac aacaaatcag aagactgagt tacaagcaat tcagctagct	1740
ctgcaggatt caggatcaga agtaaacata gtaacagact cacagtatgc attaggaatc	1800
attcaagcac aaccagataa gagtgactca gagatattta accaaataat agaacagtta	1860
ataaacaagg aaagaatcta cctgtcatgg gtaccagcac ataaaggaat tgggggaaat	1920
gaacaagtag ataaattagt aagtaaggga attaggaaag tgttg	1965

<210> 70
 <211> 1977
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Protease and Reverse Transcriptase Optimized

<400> 70	
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gaggccctgc tggacaccgg cgccgacgac accgtgctgg aggagatcga cctgccccgc	120
aagtggaagc ccaagatgat cggcggcatc ggcggcttca tcaaggtgcg ccagtacgac	180

cagatcctga	tcgagatctg	cggcaagaag	gccatcggca	ccgtgctggt	gggccccacc	240
cccgtgaaca	tcatcggccg	caacctgctg	accagctgg	gctgcaccct	gaacttcccc	300
atcagcccca	tcgagaccgt	gcccgtgaag	ctgaagcccc	gcatggacgg	ccccaagggtg	360
aagcagtggc	ccctgaccga	ggagaagatc	aaggccctga	ccgccatctg	cgaggagatg	420
gagaaggagg	gcaagatcac	caagatcggc	cccgacaacc	cctacaacac	ccccgtgttc	480
gccatcaaga	agaaggacag	caccaagtgg	cgcaagctgg	tggacttccg	cgagctgaac	540
aagcgcaccc	aggacttctg	ggaggtgcag	ctgggcatcc	cccaccccg	cggcctgaag	600
aagaagaaga	gcgtgaccgt	gctggacgtg	ggcgacgcct	acttcagcgt	gcccctggac	660
gagagcttcc	gcaagtacac	cgcttcacc	atccccagca	tcaacaacga	gacccccggc	720
atccgctacc	agtacaacgt	gctgccccag	ggctggaagg	gcagccccgc	catcttccag	780
agcagcatga	ccaagatcct	ggagcccttc	cgcgccaaga	accccgacat	cgtgatctac	840
cagtacatgg	acgacctgta	cgtgggcagc	gacctggaga	tcggccagca	ccgcgccaag	900
atcgaggagc	tgcgcgagca	cctgctgaag	tggggcttca	ccacccccga	caagaagcac	960
cagaaggagc	cccccttcc	gtggatgggc	tacgagctgc	accccgacaa	gtggaccgtg	1020
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tggaccgact	actggcaggc	cacctggatc	cccagtgagg	agttcgtgaa	cacccccccc	1560
ctggtgaagc	tgtggtacca	gctggagaag	gaccccatcg	ccggcgtgga	gaccttctac	1620
gtggacggcg	ccaccaaccg	cgaggccaag	atcggaagg	ccggctacgt	gaccgaccgc	1680
ggccgcccaga	agatcgtgac	cctgaccaac	accaccaacc	agaagaccga	gctgcaggcc	1740
atccagctgg	ccctgcagga	cagcggcagc	gaggtgaaca	tcgtgaccga	cagccagtac	1800
gccctgggca	tcatccaggc	ccagcccgac	aagagcgaca	gcgagatctt	caaccagatc	1860
atcgagcagc	tgatcaacaa	ggagcgcac	tacctgagct	gggtgccccg	ccacaagggc	1920

atcggcggca acgagcaggt ggacaagctg gtgagcaagg gcatccgcaa ggtgctg 1977

<210> 71
 <211> 1977
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Protease and Reverse Transcriptase Wild Type

<400> 71
 cctcaaatca ctctttggca gcgaccctt gtctcaataa aagtagaggg ccagataaag 60
 gaggtctct tagacacagg agcagatgat acagtattag aagaaataga ttgcccaggg 120
 aaatggaaac caaaaatgat agggggaatt ggaggtttta tcaaagtaag acagtatgat 180
 caaatactta tagaaatttg tggaaaaaag gctataggta cagtattagt agggcctaca 240
 ccagtcaaca taattggaag aaatctgtta actcagcttg gatgcacact aaattttcca 300
 attagtccta ttgaaactgt accagtaaaa ttaaaaccag gaatggatgg cccaaaggtc 360
 aaacaatggc cattgacaga agaaaaata aaagcattaa cagcaatttg tgaggaaatg 420
 gagaaggaag gaaaaattac aaaaattggg cctgataatc catataacac tccagtattt 480
 gccataaaaa agaaggacag tactaagtgg agaaaattag tagatttcag ggaactcaat 540
 aaaagaactc aagacttttg ggaagttcaa ttaggaatac cacaccagc aggattaaaa 600
 aagaaaaaat cagtgcaggt gctagatgtg ggggatgcat atttttcagt tccttttagat 660
 gaaagcttca ggaaatatac tgcattcacc atacctagta taaacaatga aacaccaggg 720
 attagatata aatataatgt gctgccacag ggatggaaag gatcaccagc aatattccag 780
 agtagcatga caaaaatctt agagcccttc agagcaaaaa atccagacat agttatctat 840
 caatatatgg atgacttgta tgtaggatct gacttagaaa tagggcaaca tagagcaaaa 900
 atagaagagt taagggaaca ttatttgaaa tggggattta caacaccaga caagaaacat 960
 caaaaagaac cccattttct ttggatgggg tatgaactcc atcctgacaa atggacagta 1020
 caacctatac tgctgccaga aaaggatagt tggactgtca atgatataca gaagttagtg 1080
 ggaaaattaa actgggcaag tcagatttac ccagggatta aagtaaggca actctgtaaa 1140
 ctcttcaggg gggccaaagc actaacagac atagtaccac taactgaaga agcagaatga 1200
 gaattggcag agaacaggga aattttaaga gaaccagtac atggagtata ttatgatcca 1260
 tcaaaagact tgatagctga aatacagaaa caggggcatg aacaatggac atatcaaatt 1320

tatcaagaac catttaaaaa tctgaaaaca gggaagtatg caaaaatgag gactaccac	1380
actaatgatg taaaacagtt aacagaggca gtgcaaaaaa tagccatgga aagcatagta	1440
atatggggaa agactcctaa atttagacta cccatccaaa aagaaacatg ggagacatgg	1500
tggacagact attggcaagc cacctggatc cctgagtggg agtttgtaa taccctccc	1560
ctagtaaaat tatggtacca actagaaaaa gatcccatag caggagtaga aactttctat	1620
gtagatggag caactaatag ggaagctaaa ataggaaaag cagggtatgt tactgacaga	1680
ggaaggcaga aaattgttac tctaactaac acaacaaatc agaagactga gttacaagca	1740
attcagctag ctctgcagga ttcaggatca gaagtaaaca tagtaacaga ctacagtat	1800
gcattaggaa tcattcaagc acaaccagat aagagtgact cagagatatt taaccaaata	1860
atagaacagt taataaaciaa ggaaagaatc tacctgtcat ggggtaccagc acataaagga	1920
attgggggaa atgaacaagt agataaatta gtaagtaagg gaattaggaa agtggtg	1977

<210> 72
 <211> 75
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C RevExon1 Optimized

<400> 72	
atggccggcc gcagcggcga cagcgacgag gccctgctgc aggtggtgaa gatcatcaag	60
atcctgtacc agagc	75

<210> 73
 <211> 76
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C RevExon1 Wild Type

<400> 73	
atggcaggaa gaagcggaga cagcgacgaa gcgctcctcc aagtgggtgaa gatcatcaaa	60
atcctctatc aaagca	76

<210> 74
 <211> 246
 <212> DNA
 <213> Artificial

<220>

<223> HIV Type C RevExon2 Optimized

<400> 74
ccctacccca agcccgaggg caccgccag gcccgccgca accgccgccg ccgctggcgc 60
gcccgccagc gccagatcca caccatcggc gagcgcatcc tggcggcctg cctggggcgc 120
agcgccgagc ccgtgcccct gcagctgccc cccctggagc gcctgcacat caactgcagc 180
gagggcagcg gcaccagcgg caccagcag agccagggca ccaccgaggg cgtggggcgac 240
ccctaa 246

<210> 75
<211> 248
<212> DNA
<213> Artificial

<220>
<223> HIV Type C RevExon2 Wild Type

<400> 75
acccttacc caagcccag gggactcgac aggctcggag gaatcgaaga agaaggtgga 60
gagcaagaca gagacagatc catacgattg gtgagcggat tcttgctcgt tgcctgggac 120
gatctgcgga gcctgtgcct cttcagctac caccgcttga gagacttcat attaattgca 180
gtgagggcag tggaacttct gggacacagc agtctcaggg gactacagag ggggtgggag 240
atccttaa 248

<210> 76
<211> 1680
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Reverse Transcriptase Optimized

<400> 76
cccatcagcc ccacgagac cgtgcccgtg aagctgaagc ccggcatgga cggccccaag 60
gtgaagcagt ggcccctgac cgaggagaag atcaaggccc tgaccgccat ctgcgaggag 120
atggagaagg agggcaagat caccaagatc ggccccgaca acccctacaa ccccccgctg 180
ttcgccatca agaagaagga cagcaccaag tggcgcaagc tggcggactt ccgcgagctg 240
aacaagcgca ccaggactt ctgggaggtg cagctgggca tccccaccc cgccggcctg 300
aagaagaaga agagcgtgac cgtgctggac gtgggcgacg cctacttcag cgtgcccctg 360
gacgagagct tccgcaagta caccgccttc accatcccca gcatcaacaa cgagaccccc 420

ggcatccgct accagtacaa cgtgctgccc cagggctgga agggcagccc cgccatcttc	480
cagagcagca tgaccaagat cctggagccc ttccgcgcca agaaccccga catcgtgatc	540
taccagtaca tggacgacct gtacgtgggc agcgacctgg agatcggcca gcaccgcgcc	600
aagatcgagg agctgcgca gcacctgctg aagtggggct tcaccacccc cgacaagaag	660
caccagaagg agccccctt cctgtggatg ggctacgagc tgcaccccga caagtggacc	720
gtgcagccca tcctgctgcc cgagaaggac agctggaccg tgaacgacat ccagaagctg	780
gtgggcaagc tgaactgggc cagccagatc taccgccgca tcaaggtgcg ccagctgtgc	840
aagctgctgc gcggcgccaa ggccctgacc gacatcgtgc ccctgaccga ggaggccgag	900
ctggagctgg ccgagaaccg cgagatcctg cgcgagcccg tgcacggcgt gtactacgac	960
cccagcaagg acctgatgc cgagatccag aagcagggcc acgagcagtg gacctaccag	1020
atctaccagg agcccttcaa gaacctgaag accggcaagt acgccaagat gcgcaccacc	1080
cacaccaacg acgtgaagca gctgaccgag gccgtgcaga agatcgccat ggagagcatc	1140
gtgatctggg gcaagacccc caagttccgc ctgcccattc agaaggagac ctgggagacc	1200
tggtgagacc actactggca ggccacctgg atccccgagt gggagttcgt gaacaccccc	1260
cccctggtga agctgtggtg ccagctggag aaggaccca tcgccggcgt ggagaccttc	1320
tacgtggacg gcgccaccaa ccgcgaggcc aagatcggca aggccggcta cgtgaccgac	1380
cgcgggccgc agaagatcgt gaccctgacc aacaccacca accagaagac cgagctgcag	1440
gccatccagc tggccctgca ggacagcggc agcgagggtga acatcgtgac cgacagccag	1500
tacgcctgg gcacatcca ggcccagccc gacaagagcg acagcgagat cttcaaccag	1560
atcatcgagc agctgatcaa caaggagcgc atctacctga gctgggtgcc cgcccacaag	1620
ggcatcggcg gcaacgagca ggtggacaag ctggtgagca agggcatccg caaggtgctg	1680

<210> 77
 <211> 1680
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Reverse Transcriptase Wild Type

<400> 77	
ccaattagtc ctattgaaac tgtaccagta aaattaaaac caggaatgga tggcccaaag	60
gtcaaacaat ggccattgac agaagaaaaa ataaaagcat taacagcaat ttgtgaggaa	120
atggagaagg aaggaaaaat tacaaaaatt gggcctgata atccatataa cactccagta	180

tttgccataa aaaagaagga cagtactaag tggagaaaat tagtagattt caggggaactc	240
aataaaagaa ctcaagactt ttgggaagtt caattaggaa taccacaccc agcaggatta	300
aaaaagaaaa aatcagtgac agtgctagat gtgggggatg catatttttc agttccttta	360
gatgaaagct tcaggaaata tactgcattc accataccta gtataaacia tgaaacacca	420
gggattagat atcaatataa tgtgctgcca cagggatgga aaggatcacc agcaatattc	480
cagagtagca tgacaaaaat cttagagccc ttcagagcaa aaaatccaga catagttatc	540
tatcaatata tggatgactt gtatgtagga tctgacttag aaatagggca acatagagca	600
aaaatagaag agttaaggga acattttattg aaatggggat ttacaacacc agacaagaaa	660
catcaaaaag aacccccatt tctttggatg gggatatgaac tccatcctga caaatggaca	720
gtacaaccta tactgctgcc agaaaaggat agttggactg tcaatgatat acagaagtta	780
gtgggaaaat taaactgggc aagtcagatt taccagggga ttaaagtaag gcaactctgt	840
aaactcctca ggggggcca agcactaaca gacatagtac cactaactga agaagcagaa	900
ttagaattgg cagagaacag ggaaatttta agagaaccag tacatggagt atattatgat	960
ccatcaaaag acttgatagc tgaaatacag aaacaggggc atgaacaatg gacatatcaa	1020
atttatcaag aaccatttaa aaatctgaaa acagggaggt atgcaaaaat gaggactacc	1080
cacactaatg atgtaaaaca gttaacagag gcagtgcaaa aaatagccat ggaaagcata	1140
gtaatatggg gaaagactcc taaatttaga ctacccatcc aaaaagaaac atggggagaca	1200
tggtggacag actattggca agccacctgg atccctgagt gggagtgtgt taatacccct	1260
cccctagtaa aattatggta ccaactagaa aaagatccca tagcaggagt agaaactttc	1320
tatgtagatg gagcaactaa tagggaagct aaaataggaa aagcagggtg tggtactgac	1380
agaggaaggc agaaaattgt tactctaact aacacaacia atcagaagac tgagttacaa	1440
gcaattcagc tagctctgca ggattcagga tcagaagtaa acatagtaac agactcacag	1500
tatgcattag gaatcattca agcacaacca gataagagtg actcagagat atttaaccaa	1560
ataatagaac agttaataaa caaggaaaga atctacctgt catgggtacc agcacataaa	1620
ggaattgggg gaaatgaaca agtagataaa ttagtaagta agggaattag gaaagtgttg	1680

<210> 78
 <211> 1668
 <212> DNA
 <213> Artificial

<220>

<223> HIV Type C Mutated Reverse Transcriptase Optimized

<400> 78

cccatcagcc ccatcgagac cgtgcccgtg aagctgaagc ccggcatgga cggccccaag	60
gtgaagcagt ggcccctgac cgaggagaag atcaaggccc tgaccgcat ctgcgaggag	120
atggagaagg agggcaagat caccaagatc ggccccgaca acccctacaa ccccccgctg	180
ttcgccatca agaagaagga cagcaccaag tggcgcaagc tgggtggactt ccgcgagctg	240
aacaagcgca ccaggactt ctgggaggtg cagctgggca tccccaccc cgccggcctg	300
aagaagaaga agagcgtgac cgtgctggac gtgggagcag cctacttcag cgtgcccctg	360
gacgagagct tccgcaagta caccgccttc accatcccca gcatcaacaa cgagaccccc	420
ggcatccgct accagtacaa cgtgctgccc cagggtctga agggcagccc cgccatcttc	480
cagagcagca tgaccaagat cctggagccc ttccgcgcca agaacccga catcgtgatc	540
taccaggccc ccctgtacgt gggcagcgac ctggagatcg gccagcaccg cgccaagatc	600
gaggagctgc gcgagcacct gctgaagtgg ggcttcacca cccccgacaa gaagcaccag	660
aaggagcccc ccttcctgcc catcgagctg cccccgaca agtggaccgt gcagcccatc	720
ctgctgcccc agaaggacag ctggaccgtg aacgacatcc agaagctggg gggcaagctg	780
aactgggcca gccagatcta ccccgcatc aaggtgcgcc agctgtgcaa gctgctgcgc	840
ggcgccaagg ccctgaccga catcgtgccc ctgaccgagg aggccgagct ggagctggcc	900
gagaaccgcg agatcctgcg cgagcccgtg cacggcgtgt actacgaccc cagcaaggac	960
ctgatcgccg agatccagaa gcagggccac gagcagtgga cctaccagat ctaccaggag	1020
cccttcaaga acctgaagac cggcaagtac gccaagatgc gcaccacca caccaacgac	1080
gtgaagcagc tgaccgaggc cgtgcagaag atcgccatgg agagcatcgt gatctggggc	1140
aagaccccca agttccgcct gcccatccag aaggagacct gggagacctg gtggaccgac	1200
tactggcagg ccacctggat ccccgagtgg gagttcgtga acaccccccc cctggtgaag	1260
ctgtggtacc agctggagaa ggaccccatc gccggcgtgg agaccttcta cgtggacggc	1320
gccaccaacc gcgaggccaa gatcggaag gccggctacg tgaccgaccg cggccgcccag	1380
aagatcgtga ccctgaccaa caccaccaac cagaagaccg agctgcaggc catccagctg	1440
gccctgcagg acagcggcag cgaggtgaac atcgtgaccg acagccagta cgccctgggc	1500
atcatccagg ccagccccga caagagcgac agcgagatct tcaaccagat catcgagcag	1560
ctgatcaaca aggagcgcac ctacctgagc tgggtgcccc ccacaaagg catcggcggc	1620

aacgagcagg tggacaagct ggtgagcaag ggcacccgca aggtgctg 1668

<210> 79
 <211> 1668
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Mutated Reverse Transcriptase Wild Type

<400> 79
 ccaattagtc ctattgaaac tgtaccagta aaattaaaac caggaatgga tggcccaaag 60
 gtcaaacaat ggccattgac agaagaaaaa ataaaagcat taacagcaat ttgtgaggaa 120
 atggagaagg aaggaaaaat tacaaaaatt gggcctgata atccatataa cactccagta 180
 tttgccataa aaaagaagga cagtactaag tggagaaaat tagtagattt cagggaactc 240
 aataaaagaa ctcaagactt ttgggaagtt caattaggaa taccacaccc agcaggatta 300
 aaaaagaaaa aatcagtgac agtgctagat gtgggggatg catatttttc agttccttta 360
 gatgaaagct tcaggaaata tactgcattc accataccta gtataaacia tgaaacacca 420
 gggattagat atcaatataa tgtgctgcca cagggatgga aaggatcacc agcaatattc 480
 cagagtagca tgacaaaaat cttagagccc ttcagagcaa aaaatccaga catagttatc 540
 tatcaagccc cgttgatatgt aggatctgac ttagaaatag ggcaacatag agcaaaaata 600
 gaagagttaa ggggaacattt attgaaatgg ggatttacia caccagacia gaaacatcaa 660
 aaagaacccc catttcttcc catcgaactc catcctgaca aatggacagt acaacctata 720
 ctgctgccag aaaaggatag ttggactgtc aatgatatac agaagttagt gggaaaatta 780
 aactgggcaa gtcagattta ccaggggatt aaagtaaggc aactctgtaa actcctcagg 840
 ggggccaag cactaacaga catagtacca ctaactgaag aagcagaatt agaattggca 900
 gagaacaggg aaattttaag agaaccagta catggagtat attatgatcc atcaaaagac 960
 ttgatagctg aaatacagaa acaggggcat gaacaatgga catatcaaat ttatcaagaa 1020
 ccatttaaaa atctgaaaac aggggaagtat gcaaaaatga ggactaccca cactaatgat 1080
 gtaaaacagt taacagaggc agtgcaaaaa atagccatgg aaagcatagt aatatgggga 1140
 aagactccta aatttagact acccatccaa aaagaaacat gggagacatg gtggacagac 1200
 tattggcaag ccacctggat ccctgagtgg gagtttggtta ataccctcc cctagtaaaa 1260
 ttatggtacc aactagaaaa agatcccata gcaggagtag aaactttcta tgtagatgga 1320

gcaactaata gggaagctaa aataggaaaa gcagggtatg ttactgacag aggaaggcag 1380
aaaattgtta ctctaactaa cacaacaaat cagaagactg agttacaagc aattcagcta 1440
gctctgcagg attcaggatc agaagtaaac atagtaacag actcacagta tgcattagga 1500
atcattcaag cacaaccaga taagagtgac tcagagatat ttaaccaa atagaacag 1560
ttaataaaca aggaaagaat ctacctgtca tgggtaccag cacataaagg aattggggga 1620
aatgaacaag tagataaatt agtaagtaag ggaattagga aagtgttg 1668

<210> 80
<211> 216
<212> DNA
<213> Artificial

<220>
<223> HIV Type C TatC22Exon1 Optimized

<400> 80
atggagcccg tggaccccaa gctgaagccc tggaaccacc ccggcagcca gcccaagacc 60
gccggcaaca actgcttctg caagcactgc agctaccact gcctggtgtg cttccagacc 120
aagggcctgg gcatcagcta cggccgcaag aagcgccgcc agcgccgcag cccccccccc 180
agcggcgagg accaccagaa cccctgagc aagcag 216

<210> 81
<211> 216
<212> DNA
<213> Artificial

<220>
<223> HIV Type C TatExon1 Optimized

<400> 81
atggagcccg tggaccccaa gctgaagccc tggaaccacc ccggcagcca gcccaagacc 60
gcctgcaaca actgcttctg caagcactgc agctaccact gcctggtgtg cttccagacc 120
aagggcctgg gcatcagcta cggccgcaag aagcgccgcc agcgccgcag cccccccccc 180
agcggcgagg accaccagaa cccctgagc aagcag 216

<210> 82
<211> 216
<212> DNA
<213> Artificial

<220>
<223> HIV Type C TatExon1 Wild Type

<400> 82
atggagccag tagatcctaa actaaagccc tggaaaccatc caggaagcca acctaaaaca 60
gcttgtaata attgcttttg caaacactgt agctatcatt gtctagtttg ctttcagaca 120
aaaggtttag gcatttccta tggcaggaag aagcggagac agcgacgaag cgctcctcca 180
agtggatgaag atcatcaaaa tcctctatca aagcag 216

<210> 83
<211> 93
<212> DNA
<213> Artificial

<220>
<223> HIV Type C TatExon2 Optimized

<400> 83
ccccctgccc agggccgcgg cgacagcacc ggcagcgagg agagcaagaa gaagggtggag 60
agcaagaccg agaccgaccc ctacgactgg tga 93

<210> 84
<211> 93
<212> DNA
<213> Artificial

<220>
<223> HIV Type C TatExon2 Wild Type

<400> 84
cccttacccc aagccccgagg ggactcgaca ggctcggagg aatcgaagaa gaagggtggag 60
agcaagacag agacagatcc atacgattgg tga 93

<210> 85
<211> 579
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Vif Optimized

<400> 85
atggagaacc gctggcaggt gctgatcgtg tggcaggtgg accgcatgaa gatccgcgcc 60
tggaaacagcc tggatgaagca ccacatgtac atcagccgcc gcgccagcgg ctgggtgtac 120
cgccaccact tcgagagccg ccaccccaag gtgagcagcg aggtgcacat cccctggggc 180
gacgcccgcc tggatgatcaa gacctactgg ggctgcaga ccggcgagcg cgactggcac 240
ctggggccacg gcgtgagcat cgagtggcgc ctgcgcgagt acagcaccca ggtggacccc 300

gacctggccg accagctgat ccacatgcac tacttcgact gcttcaccga gagcgccatc	360
cgccaggcca tcctggggcca catcgtgttc ccccgctgcg actaccaggc cggccacaag	420
aaggtgggca gcctgcagta cctggccctg accgcccctga tcaagcccaa gaagcgcaag	480
ccccccctgc ccagcgtgcg caagctgggtg gaggaccgct ggaacgaccc ccagaagacc	540
cgcgggccgcc gcggaacca caccatgaac ggccactag	579

<210> 86
 <211> 579
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Vif Wild Type

<400> 86	
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agacatcatt ttgaaagcag acatccaaaa gtaagttcag aagtacatat ccattagggt	180
gatgctagat tagtaataaa aacatattgg ggtttgcaga caggagaaaag agattggcat	240
ttgggtcatg gagtctccat agaatggaga ctgagagaaat acagcacaca agtagaccct	300
gacctggcag accagctaatt tcacatgcat tattttgatt gttttacaga atctgccata	360
agacaagcca tattaggaca catagttttt cctaggtgtg actatcaagc aggacataag	420
aaggtaggat ctctgcaata cttggcactg acagcattga taaaacaaaa aaagagaaaag	480
ccacctctgc ctagtgttag aaaattagta gaggatagat ggaacgaccc ccagaagacc	540
agggggccgca gaggggaacca tacaatgaat ggacactag	579

<210> 87
 <211> 288
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Vpr Optimized

<400> 87	
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gagatcctgg aggagctgaa gcaggaggcc gtgcgccact tccccgccc ctggctgcac	120
agcctggggc agtacatcta cgagacctac ggcgacacct ggaccggcgt ggaggccatc	180
atccgcgtgc tgcagcagct gctgttcac cacttccgca tcggctgcca gcacagccgc	240

atcgggcatcc tgcgccagcg ccgcgcccgc aacggcgcca gccgcagc 288

<210> 88
 <211> 288
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Vpr Wild Type

<400> 88
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 agcttaggac aatatatcta tgaaacctat ggggatactt ggacgggagt tgaagctata 180
 ataagagtac tgcaacaact actgttcatt catttcagaa ttggatgcca acatagcaga 240
 ataggcatct tgcgacagag aagagcaaga aatggagcca gtagatcc 288

<210> 89
 <211> 267
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Vpu Optimized

<400> 89
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 gtgcgccaga agaagatcga ctggctgac aagcgcaccc gcgagcgcg cgaggacagc 180
 ggcaacgaga gcgacggcga caccgaggag ctgagcacca tgggtggacat gggccacctg 240
 cgcttgctgg acgccaacga cctgtaa 267

<210> 90
 <211> 267
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C Vpu Wild Type

<400> 90
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 gtagcactaa tcatagcaat aatagtgtgg accatagcat atatagaata taggaaattg 120

gtaagacaaa agaaaataga ctggttaatt aaaagaatta gggaaagagc agaagacagt 180
ggcaatgaga gtgatgggga cacagaagaa ttgtcaacaa tggatgatgat ggggcatctt 240
aggcttctgg atgctaata tttgtaa 267

<210> 91
<211> 321
<212> DNA
<213> Artificial

<220>
<223> HIV Type C RevExon 1 and 2 Optimized

<400> 91
atggccggcc gcagcggcga cagcgacgag gccctgctgc aggtgggtgaa gatcatcaag 60
atcctgtacc agagccccta cccaagccc gagggcagcc gccaggcccg ccgcaaccgc 120
cgccgcccgt ggcgcgcccg ccagcgccag atccacacca tcggcgagcg catcctgggtg 180
gcctgcctgg gccgcagcgc cgagcccgtg cccctgcagc tgccccccct ggagcgcttg 240
cacatcaact gcagcgaggg cagcggcacc agcggcagcc agcagagcca gggcaccacc 300
gagggcgctgg gcgaccccta a 321

<210> 92
<211> 324
<212> DNA
<213> Artificial

<220>
<223> HIV Type C RevExon 1 and 2 Wild Type

<400> 92
atggcaggaa gaagcggaga cagcgacgaa gcgctcctcc aagtgggtgaa gatcatcaaa 60
atcctctatc aaagcaaccc ttacccaag cccgagggga ctgcagagc tcggaggaat 120
cgaagaagaa ggtggagagc aagacagaga cagatccata cgattgggtga gcggattctt 180
gtcgcttgcc tgggacgatc tgcggagcct gtgcctcttc agctaccacc gcttgagaga 240
cttcatatta attgcagtga gggcagtgga acttctggga cacagcagtc tcaggggact 300
acagaggggg tgggagatcc ttaa 324

<210> 93
<211> 309
<212> DNA
<213> Artificial

<220>

<223> HIV Type C TatC22 Exon 1 and 2 Optimized

<400> 93

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gccggcaaca actgcttctg caagcactgc agctaccact gcctggtgtg cttccagacc    120
aagggcctgg gcatcagcta cggccgcaag aagcgccgcc agcgccgcag cgcccccccc    180
agcggcgagg accaccagaa cccctgagc aagcagcccc tgccccaggc ccgcggcgac    240
agcaccggca gcgaggagag caagaagaag gtggagagca agaccgagac cgaccctac    300
gactggtga                                     309
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<210> 94

<211> 309

<212> DNA

<213> Artificial

<220>

<223> HIV Type C Tat Exon 1 and 2 Optimized

<400> 94

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gcctgcaaca actgcttctg caagcactgc agctaccact gcctggtgtg cttccagacc    120
aagggcctgg gcatcagcta cggccgcaag aagcgccgcc agcgccgcag cgcccccccc    180
agcggcgagg accaccagaa cccctgagc aagcagcccc tgccccaggc ccgcggcgac    240
agcaccggca gcgaggagag caagaagaag gtggagagca agaccgagac cgaccctac    300
gactggtga                                     309
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<210> 95

<211> 309

<212> DNA

<213> Artificial

<220>

<223> HIV Type C Tat Exon 1 and 2 Wild Type

<400> 95

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gcttgtaata attgcttttg caaacactgt agctatcatt gtctagtttg ctttcagaca    120
aaaggttttag gcatttccta tggcaggaag aagcggagac agcgacgaag cgctcctcca    180
agtgggtaag atcatcaaaa tcctctatca aagcagccct taccccaagc ccgagggggac    240
tcgacaggct cggaggaatc gaagaagaag gtggagagca agacagagac agatccatac    300
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gattggtga 309

<210> 96
 <211> 624
 <212> DNA
 <213> Artificial

<220>
 <223> HIV Type C NefD125g Optimized Myristalization Modification

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 cgccgcaccg agcccgccgc cgagggcggtg ggcgccgcca gccaggacct ggaccgccac 120
 ggcgcctga ccagcagcaa cccccccgcc accaacgagg cctgcgcctg gctgcaggcc 180
 caggaggagg acggcgacgt gggcttcccc gtgcgcccc aggtgcccc gcgccccatg 240
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 ctgatctaca gccgcaagcg ccaggagatc ctggacctgt ggggtgtaca caccagggc 360
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 gaggacaact gcctgctgca ccccatgagc cagcacggcg ccgaggacga ggaccgagc 540
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 cccgagtact acaaggactg ctga 624

<210> 97
 <211> 2565
 <212> DNA
 <213> Artificial

<220>
 <223> Envgp160_TV2_C_ZAopt

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tggggcctgg agctgaagaa gagcgccatc aacctgctgg acaccatcg catcgccgtg	2460
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<210> 98
 <211> 2565
 <212> DNA
 <213> Artificial

<220>
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gcacattgta acattagtaa aaatgaatgg aatacaactt tacaaagggg aagtcaaaaa	1020
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gctgaaggaa cagataggat tctagaattc atacaaaacc tttgtagagg tatccgcaac	2520
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<211> 1491
 <212> DNA
 <213> Artificial

<220>
 <223> Gag_TV2_C_ZAopt

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 cccccgcgcg agagcttcaa gttcaaggag acccccaagc aggagcccaa ggaccgcgag 1440
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<210> 100
 <211> 1491
 <212> DNA
 <213> Artificial

<220>
 <223> Gag_TV2_C_ZAwt

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 ctggaaagat ttgcagttaa ccctggcctt ttagagacat cagacggatg tagacaaata 180
 ataaaacagc tacaaccagc tcttcagaca ggaacagagg aaattagatc attatttaac 240
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gagaacaact gctgtgtgca ccccatgagc cagcacggca tggaggacga ggaccgag 540
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cccgagtact acaaggactg ctga 624

<210> 102
<211> 624
<212> DNA
<213> Artificial

<220>
<223> Nef_TV2_C_ZA_wt

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ggggcactta caaccagcaa cacagcccac aacaatgctg cttgcgcctg gctggaagcg 180
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acttataaag cagcaataga tctcagcttc tttttaaaag aaaagggggg actggaaggg 300
ttaatttact ccaagaaaag gcaagagatc cttgatttgt gggtttataa cacacaaggc 360

ttctttccctg attggcaaaa ctacacaccg ggaccagggg tcagatttcc actgaccttt	420
ggatgggtact tcaagctaga gccagtcgat ccaaggggaag tagaagaggc caatgaagga	480
gaaaacaact gtttactaca ccctatgagc cagcatggaa tggaggatga agacagagaa	540
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ccggagtatt acaaagactg ctga	624

<210> 103
 <211> 3009
 <212> DNA
 <213> Artificial

<220>
 <223> Pol_TV2_C_ZAopt

<400> 103	
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cagggcgaca gcgaggccgg cgccgagcgc cagggcacct tcaacttccc ccagatcacc	180
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gagaccgtgc ccgtgaagct gaagcccggc atggacggcc ccaaggtgaa gcagtggccc	540
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<210> 104
 <211> 3009
 <212> DNA
 <213> Artificial

<220>
 <223> Pol_TV2_C_ZAwt

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caaggagact ccgaagcagg agccgaaaga cagggaacct ttaacttccc tcaaactact	180
ctttggcagc gaccccttgt ctcaataaaa gtagcgggcc aaacaaagga ggctctttta	240
gatacaggag cagatgatac agtactagaa gaaataaact tgccaggaaa atggaaacca	300
aaaatgatag gaggaattgg aggttttatc aaagtaagac agtatgatca aatacttata	360
gaaatttgtg gaaaaagggc tataggtaca gtattagtag gacctacacc tgtcaacata	420
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aaaattacaa aaattggggc tgaaaatcca tataacactc cagtatttgc cataaagaag	660
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gaaggggcag tagtaataca agataatagt gatataaagg tagtaccaag aaggaaagca	2940
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gatgaagat	3009

<210> 105
 <211> 75
 <212> DNA
 <213> Artificial

<220>
 <223> RevExon1_TV2_C_ZAopt

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atcctgtacc agagc	75

<210> 106
 <211> 76
 <212> DNA
 <213> Artificial

<220>
 <223> RevExon1_TV2_C_ZAwt

<400> 106	
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atcctctacc aaagca	76

<210> 107
 <211> 246
 <212> DNA
 <213> Artificial

<220>
 <223> RevExon2_TV2_C_ZAopt

<400> 107	
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gcccgccagc agcagatcca cagcatcagc gagcgcatcc tggacacctg cctgggcccgc	120
cccaccaagc ccgtgcccct gctgctgccc cccatcgagc gcctgcacat caactgcagc	180
gagagcagcg gcaccagcgg caccagtag agccagggca ccgcccaggg cgtgggcaac	240
ccctaa	246

<210> 108

<211> 248
 <212> DNA
 <213> Artificial

 <220>
 <223> RevExon2_TV2_C_ZAwt

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 gagcaagaca gcagcagatc cattcgatta gtgagcggat tcttgacact tgcctgggac 120
 gacctacgaa gcctgtgcct cttctgctac caccgattga gagacttcat attaattgta 180
 gtgagagcag tggaacttct gggacacagt agtctcaggg gactgcagag ggggtgggga 240
 acccttaa 248

 <210> 109
 <211> 216
 <212> DNA
 <213> Artificial

 <220>
 <223> TatExon1_TV2_C_ZAopt

 <400> 109
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 aagggcctgg gcatttacta cggccgcaag aagcgcgcgc agcgcgcgag cgcccccccc 180
 agcaacaagg accaccagga cccctgccc aagcag 216

 <210> 110
 <211> 216
 <212> DNA
 <213> Artificial

 <220>
 <223> TatExon1_TV2_C_ZAwt

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 aaaggcttag gcatttacta tggcaggaag aagcggagac agcgacgaag cgctcctcca 180
 agcaataaag atcatcaaga tcctctacca aagcag 216

 <210> 111
 <211> 90

<212> DNA
 <213> Artificial

 <220>
 <223> TatExon2_TV2_C_ZAopt

 <400> 111
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 agcaagaccg ccgccgaccc cttcgactag 90

 <210> 112
 <211> 90
 <212> DNA
 <213> Artificial

 <220>
 <223> TatExon2_TV2_C_ZAwt

 <400> 112
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 agcaagacag cagcagatcc attcgattag 90

 <210> 113
 <211> 579
 <212> DNA
 <213> Artificial

 <220>
 <223> Vif_TV2_C_ZAopt

 <400> 113
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 tggcacagcc tgggtgaagca ccacatgtac gtgagccgcc gcgccgacgg ctggttctac 120
 cgccaccact acgagagccg ccacccaag gtgagcagcg aggtgcacat cccctggggc 180
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 aaggtgggca gcctgcagta cctggccctg accgccctga tcaagcccaa gaagatcaag 480
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 <210> 114

<211> 579
 <212> DNA
 <213> Artificial

 <220>
 <223> Vif_TV2_C_ZAwt

 <400> 114
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 gatgccaggt tagtaataaa aacatattgg ggtctgcaga caggagaaag agcttggcat 240
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 aaggtaggat ctctacaata cttggcactg acagcattga taaaaccaa aaagataaag 480
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 agggggccgca gaggggaacca tacaatgaat ggacactag 579

<210> 115
 <211> 288
 <212> DNA
 <213> Artificial

 <220>
 <223> Vpr_TV2_C_ZAopt

 <400> 115
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 gagctgctgg aggagctgaa gcaggaggcc gtgcgccact tccccgccc ctggctgcac 120
 aacctgggccc agcacatcta cgagacctac ggcgacacct ggaccggcgt ggaggccatc 180
 atccgcatcc tgcagcagct gctgttcac cacttccgca tcggctgcca ccacagccgc 240
 atcggcatcc tgcgccagcg ccgcgcccgc aacggcgcca accgcagc 288

<210> 116
 <211> 288
 <212> DNA
 <213> Artificial

 <220>
 <223> Vpr_TV2_C_ZAwt

<400> 116
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gagcttttag aagaactcaa gcaggaagct gtcagacact ttcctagacc atggctccat 120
aacttaggac aacatatcta tgaaacctat ggagatactt ggacaggagt tgaagcaata 180
ataagaatcc tgcaacaatt actgtttatt catttcagga ttgggtgcca tcatagcaga 240
ataggcattt tgcgacagag aagagcaaga aatggagcca atagatcc 288

<210> 117
<211> 261
<212> DNA
<213> Artificial

<220>
<223> Vpu_TV2_C_ZAopt

<400> 117
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cagcgcaaga tcgactggct ggtgaagcgc atccgcgagc gcgccgagga cagcggcaac 180
gagagcgagg gcgacaccga ggagctgagc accctgggtg acatggggcca cctgcgcctg 240
ctggagcgcca acgacgtgta a 261

<210> 118
<211> 261
<212> DNA
<213> Artificial

<220>
<223> Vpu_TV2_C_ZAwt

<400> 118
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caaaggaaaa tagactgggt agttaaagg attagggaaa gagcagaaga cagtggcaat 180
gagagcgagg gggatactga agaattatcg aactgggtg atatggggca tcttaggctt 240
ttggatgcta atgatgtgta a 261

<210> 119
<211> 1473
<212> DNA
<213> Artificial

<220>

<223> gp120mod.TV1.delV2

<400> 119

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<212> DNA
<213> Artificial

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<220>
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<210> 129
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<212> PRT
<213> Artificial

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<220>
<223> wild-type amino acid sequence changed by mutation in gp120/gp41
      cleavage site

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<400> 129

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<210> 130
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<220>
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      cleavage site

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<400> 130

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<220>

<223> gp140mod.TV1.tpa1

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 <213> Artificial

<220>
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atgaagaact	gcagcttcaa cgccaccacc gagctgcgcg acaagaagca caaggagtac 540
gccctgttct	accgcctgga catcgtgccc ctgaacgaga acagcgacaa cttcacctac 600
cgctgatca	actgcaacac cagcaccatc acccaggcct gcccacaggt gagcttcgac 660


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cccatcccca tccactactg cgcccccgcc ggctacgcca tcctgaagtg caacaacaag 720
accttcaacg gcaccggccc ctgctacaac gtgagcaccg tgcagtgcac ccacggcatc 780
aagcccgtgg tgagcaccca gctgctgctg aacggcagcc tggccgagga gggcatcatc 840
atccgcagcg agaacctgac cgagaacacc aagaccatca tcgtgcacct gaacgagagc 900
gtggagatca actgcacccg cccaacaac aacacccgca agagcgtgcg catcggcccc 960
ggccaggcct tctacgccac caacgacgtg atcggaaca tccgccaggc cactgcaac 1020
atcagcaccg accgctggaa caagaccctg cagcaggtga tgaagaagct gggcgagcac 1080
ttccccaaca agaccatcca gttcaagccc cagccggcg gcgacctgga gatcaccatg 1140
cacagcttca actgccgcgg cgagttcttc tactgcaaca ccagcaacct gttcaacagc 1200
acctaccaca gcaacaacgg cacctacaag tacaacggca acagcagcag ccccatcacc 1260
ctgcagtgca agatcaagca gatcgtgcg atgtggcagg gcgtgggcca ggccacctac 1320
gccccccca tcgccggcaa catcacctgc cgcagcaaca tcaccggcat cctgctgacc 1380
cgcgacggcg gcttcaacac caccaacaac accgagacct tccgccccgg cggcggcgac 1440
atgcgcgaca actggcgag cgagctgtac aagtacaagg tggaggagat caagcccctg 1500
ggcatcgccc ccaccaaggc caagcgccgc gtggtgcagc gcgagaagcg cgccgtgggc 1560
atcggcgccg tgttcctggg ctctctgggc gccgccggca gcaccatggg cgccgccagc 1620
atcacctga ccgtgcaggc ccgccagctg ctgagcggca tcgtgcagca gcagagcaac 1680
ctgctgaagg ccatcgaggc ccagcagcac atgctgcagc tgaccgtgtg gggcatcaag 1740
cagctgcagg cccgcgtgct ggccatcgag cgctacctga aggaccagca gctgctgggc 1800
atctggggct gcagcgccg cctgatctgc accaccgccg tgccctggaa cagcagctgg 1860
agcaacaaga gcgagaagga catctgggac aacatgacct ggatgcagtg ggaccgcgag 1920
atcagcaact acaccggcct gatctacaac ctgctggagg acagccagaa ccagcaggag 1980
aagaacgaga aggacctgct ggagctggac aagtgaaca acctgtggaa ctggttcgac 2040
atcagcaact ggccctggta catctaactc gag 2073

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<210> 133
<211> 2073
<212> DNA
<213> Artificial

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<220>
<223> gp140mod.TV1.wtLnative

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<400> 133

gaattcatga gagtgatggg gacacagaag aattgtcaac aatgggtggat atggggcatc	60
ttaggcttct ggatgctaata gatttgtaac accgaggacc tgtgggtgac cgtgtactac	120
ggcgtgcccg tgtggcgcca cgccaagacc accctgttct gcgccagcga cgccaaggcc	180
tacgagaccg aggtgcacaa cgtgtggggc acccacgcct gcgtgcccac cgaccccaac	240
ccccaggaga tcgtgctggg caacgtgacc gagaacttca acatgtggaa gaacgacatg	300
gccgaccaga tgcacgagga cgtgatcagc ctgtgggacc agagcctgaa gccctgcgtg	360
aagctgacct cctgtgcgt gacctgaac tgcaccgaca ccaacgtgac cggcaaccgc	420
accgtgaccg gcaacagcac caacaacacc aacggcaccg gcatctacaa catcgaggag	480
atgaagaact gcagcttcaa cgccaccacc gagctgcgcg acaagaagca caaggagtac	540
gccctgttct accgctgga catcgtgcc ctgaacgaga acagcgacaa cttcacctac	600
cgctgatca actgcaacac cagcaccatc acccaggcct gcccgaagg gagcttcgac	660
cccatcccca tccactactg cgcggcgcc ggctacgcca tcctgaagtg caacaacaag	720
accttcaacg gcaccggccc ctgctacaac gtgagcaccg tgcagtgcac ccacggcatc	780
aagcccgagg tgagcaccca gctgctgctg aacggcagcc tggccgagga gggcatcatc	840
atccgcagcg agaacctgac cgagaacacc aagaccatca tcgtgcacct gaacgagagc	900
gtggagatca actgcacccg cccaacaac aacacccgca agagcgtgcg catcggcccc	960
ggccaggcct tctacgccac caacgacgtg atcggaaca tccgccaggc cactgcaac	1020
atcagcaccg accgctggaa caagaccctg cagcagggtga tgaagaagct gggcgagcac	1080
ttccccaaca agaccatcca gttcaagccc cagcgccggcg gcgacctgga gatcaccatg	1140
cacagcttca actgccggcg cgagttcttc tactgcaaca ccagcaacct gttcaacagc	1200
acctaccaca gcaacaacgg cacctacaag tacaacggca acagcagcag ccccatcacc	1260
ctgcagtgca agatcaagca gatcgtgcgc atgtggcagg gcgtgggcca ggccacctac	1320
gcccccccca tcgccggcaa catcacctgc cgcagcaaca tcaccggcat cctgctgacc	1380
cgcgacggcg gcttcaacac caccaacaac accgagacct tccgccccgg cggcggcgac	1440
atgcgcgaca actggcgag cgagctgtac aagtacaagg tggaggagat caagcccctg	1500
ggcatcgccc ccaccaaggc caagcgccgc gtggtgcagc gcgagaagcg cgccgtgggc	1560
atcggcgccg tgttcctggg cttcctgggc gccgccggca gcaccatggg cgccgccagc	1620
atcacctga ccgtgcaggc ccgccagctg ctgagcggca tcgtgcagca gcagagcaac	1680

ctgctgaagg ccatcgaggc ccagcagcac atgctgcagc tgaccgtgtg gggcatcaag	1740
cagctgcagg cccgcgtgct ggccatcgag cgctacctga aggaccagca gctgctgggc	1800
atctggggct gcagcggccg cctgatctgc accaccgccg tgccctggaa cagcagctgg	1860
agcaacaaga gcgagaagga catctgggac aacatgacct ggatgcagtg ggaccgcgag	1920
atcagcaact acaccggcct gatctacaac ctgctggagg acagccagaa ccagcaggag	1980
aagaacgaga aggacctgct ggagctggac aagtggaaca acctgtggaa ctggttcgac	2040
atcagcaact ggccctggta catctaactc gag	2073

<210> 134
 <211> 624
 <212> DNA
 <213> Artificial

<220>
 <223> NefD125G_TV2_C_ZAopt

<400> 134	
atgggcggca agtggagcaa gagcagcatc atcggtggc ccgaggtgcg cgagcgcac	60
cgccgcaccc gcagcgccgc cgagggcggtg ggcagcgcca gccaggacct ggagaagcac	120
ggcgccctga ccaccagcaa caccgcccac aacaacgccg cctgcgcctg gctggaggcc	180
caggaggagg agggcgaggt gggcttcccc gtgcgcccc aggtgcccct gcgccccatg	240
acctacaagg ccgccatcga cctgagcttc ttctgaagg agaagggcgg cctggagggc	300
ctgatctaca gcaagaagcg ccaggagatc ctggacctgt ggggtgtacaa caccagggc	360
ttcttccccg gctggcagaa ctacaccccc ggccccggcg tgcgcttccc cctgaccttc	420
ggctgggtact tcaagctgga gcccggtggac ccccgcgagg tggaggaggc caacgagggc	480
gagaacaact gcctgctgca ccccatgagc cagcacggca tggaggacga ggaccgcgag	540
gtgctgcgct ggaagttega cagcaccctg gcccgccgcc acatggcccc cgagctgcac	600
cccgagtact acaaggactg ctga	624

<210> 135
 <211> 624
 <212> DNA
 <213> Artificial

<220>
 <223> NefD125G-Myr_TV2_C_ZAopt

<400> 135	
atggccggca agtggagcaa gagcagcatc atcggtggc ccgaggtgcg cgagcgcac	60

cgccgcaccc gcagcgccgc cgagggcggtg ggcagcgcca gccaggacct ggagaagcac 120
ggcgccctga ccaccagcaa caccgcccac aacaacgccg cctgcgcctg gctggaggcc 180
caggaggagg agggcgaggt gggcttcccc gtgcgcccc aggtgcccct gcgccccatg 240
acctacaagg ccgccatcga cctgagcttc ttctgaagg agaagggcgg cctggagggc 300
ctgatctaca gcaagaagcg ccaggagatc ctggacctgt ggggtgtacaa caccagggc 360
ttcttccccg gctggcagaa ctacaccccc ggccccggcg tgcgcttccc cctgaccttc 420
ggctggtact tcaagctgga gcccgtagc ccccgcgagg tggaggaggc caacgagggc 480
gagaacaact gcctgctgca ccccatgagc cagcacggca tggaggacga ggaccgag 540
gtgctgcgtt ggaagttcga cagcacctg gcccgccgcc acatggcccc cgagctgcac 600
cccgagtact acaaggactg ctga 624

<210> 136
<211> 27
<212> PRT
<213> Artificial

<220>
<223> TV1c8.2 signal peptide leader sequence
<400> 136

Met Arg Val Met Gly Thr Gln Lys Asn Cys Gln Gln Trp Trp Ile Trp
1 5 10 15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys
20 25

<210> 137
<211> 81
<212> DNA
<213> Artificial

<220>
<223> WTnative (8-2_TV1_C.ZA) signal peptide leader sequence

<400> 137
atgagagtga tggggacaca gaagaattgt caacaatggt ggatatgggg catcttaggc 60
ttctggatgc taatgatttg t 81

<210> 138
<211> 81
<212> DNA

<213> Artificial

<220>

<223> WTmod (8-2_TV1_C.ZA) signal peptide leader sequence

<400> 138
atgcgcgtga tgggcaccca gaagaactgc cagcagtggg ggatctgggg catcctgggc 60
ttctggatgc tgatgatctg c 81

<210> 139
<211> 25
<212> PRT
<213> Artificial

<220>

<223> Tpa1 signal peptide leader sequence

<400> 139

Met Asp Ala Met Lys Arg Gly Leu Cys Cys Val Leu Leu Leu Cys Gly
1 5 10 15

Ala Val Phe Val Ser Pro Ser Ala Ser
20 25

<210> 140
<211> 75
<212> DNA
<213> Artificial

<220>

<223> Tpa1 signal peptide leader sequence

<400> 140
atggatgcaa tgaagagagg gctctgctgt gtgctgctgc tgtgtggagc agtcttcgtt 60
tcgcccagcg ccagc 75

<210> 141
<211> 23
<212> PRT
<213> Artificial

<220>

<223> Tpa2 signal peptide leader sequence

<400> 141

Met Asp Ala Met Lys Arg Gly Leu Cys Cys Val Leu Leu Leu Cys Gly
1 5 10 15

Ala Val Phe Val Ser Pro Ser
20

<210> 142
<211> 69
<212> DNA
<213> Artificial

<220>
<223> Tpa2 signal peptide leader sequence

<400> 142
atggatgcaa tgaagagagg gctctgctgt gtgctgctgc tgtgtggagc agtccttcggt 60
tcgcccagc 69

<210> 143
<211> 842
<212> PRT
<213> Human immunodeficiency virus SF162

<400> 143

Met Asp Ala Met Lys Arg Gly Leu Cys Cys Val Leu Leu Leu Cys Gly
1 5 10 15

Ala Val Phe Val Ser Pro Ser Ala Val Glu Lys Leu Trp Val Thr Val
20 25 30

Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr Thr Thr Leu Phe Cys
35 40 45

Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His Asn Val Trp Ala
50 55 60

Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln Glu Ile Val Leu
65 70 75 80

Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu
85 90 95

Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu Lys Pro
100 105 110

Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu His Cys Thr Asn Leu
115 120 125

Lys Asn Ala Thr Asn Thr Lys Ser Ser Asn Trp Lys Glu Met Asp Arg
 130 135 140

 Gly Glu Ile Lys Asn Cys Ser Phe Lys Val Thr Thr Ser Ile Arg Asn
 145 150 155 160

 Lys Met Gln Lys Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Pro
 165 170 175

 Ile Asp Asn Asp Asn Thr Ser Tyr Lys Leu Ile Asn Cys Asn Thr Ser
 180 185 190

 Val Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile
 195 200 205

 His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys
 210 215 220

 Lys Phe Asn Gly Ser Gly Pro Cys Thr Asn Val Ser Thr Val Gln Cys
 225 230 235 240

 Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
 245 250 255

 Ser Leu Ala Glu Glu Gly Val Val Ile Arg Ser Glu Asn Phe Thr Asp
 260 265 270

 Asn Ala Lys Thr Ile Ile Val Gln Leu Lys Glu Ser Val Glu Ile Asn
 275 280 285

 Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Thr Ile Gly Pro
 290 295 300

 Gly Arg Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln
 305 310 315 320

 Ala His Cys Asn Ile Ser Gly Glu Lys Trp Asn Asn Thr Leu Lys Gln
 325 330 335

 Ile Val Thr Lys Leu Gln Ala Gln Phe Gly Asn Lys Thr Ile Val Phe
 340 345 350

 Lys Gln Ser Ser Gly Gly Asp Pro Glu Ile Val Met His Ser Phe Asn

355		360		365
Cys Gly Gly Glu Phe Phe Tyr Cys Asn Ser Thr Gln Leu Phe Asn Ser				
370		375		380
Thr Trp Asn Asn Thr Ile Gly Pro Asn Asn Thr Asn Gly Thr Ile Thr				
385		390		395 400
Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Arg Trp Gln Glu Val Gly				
	405		410	415
Lys Ala Met Tyr Ala Pro Pro Ile Arg Gly Gln Ile Arg Cys Ser Ser				
	420		425	430
Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Lys Glu Ile Ser				
	435		440	445
Asn Thr Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn				
	450		455	460
Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu				
465		470		475 480
Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys				
	485		490	495
Arg Ala Val Thr Leu Gly Ala Met Phe Leu Gly Phe Leu Gly Ala Ala				
	500		505	510
Gly Ser Thr Met Gly Ala Arg Ser Leu Thr Leu Thr Val Gln Ala Arg				
	515		520	525
Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala				
	530		535	540
Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys				
545		550		555 560
Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln				
	565		570	575
Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr				
	580		585	590

Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Asp Gln Ile
595 600 605

Trp Asn Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr
610 615 620

Thr Asn Leu Ile Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu
625 630 635 640

Lys Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp
645 650 655

Asn Trp Phe Asp Ile Ser Lys Trp Leu Trp Tyr Ile Lys Ile Phe Ile
660 665 670

Met Ile Val Gly Gly Leu Val Gly Leu Arg Ile Val Phe Thr Val Leu
675 680 685

Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln
690 695 700

Thr Arg Phe Pro Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu
705 710 715 720

Glu Glu Gly Gly Glu Arg Asp Arg Asp Arg Ser Ser Pro Leu Val His
725 730 735

Gly Leu Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe
740 745 750

Ser Tyr His Arg Leu Arg Asp Leu Ile Leu Ile Ala Ala Arg Ile Val
755 760 765

Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Trp Gly Asn
770 775 780

Leu Leu Gln Tyr Trp Ile Gln Glu Leu Lys Asn Ser Ala Val Ser Leu
785 790 795 800

Phe Asp Ala Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile
805 810 815

Glu Val Ala Gln Arg Ile Gly Arg Ala Phe Leu His Ile Pro Arg Arg
820 825 830

Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu
835 840

<210> 144
<211> 867
<212> PRT
<213> Human immunodeficiency virus TV1.8_2

<400> 144

Met Arg Val Met Gly Thr Gln Lys Asn Cys Gln Gln Trp Trp Ile Trp
1 5 10 15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Thr Glu Asp Leu
20 25 30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Lys Thr
35 40 45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val His
50 55 60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
65 70 75 80

Glu Ile Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
85 90 95

Asp Met Ala Asp Gln Met His Glu Asp Val Ile Ser Leu Trp Asp Gln
100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
115 120 125

Cys Thr Asp Thr Asn Val Thr Gly Asn Arg Thr Val Thr Gly Asn Ser
130 135 140

Thr Asn Asn Thr Asn Gly Thr Gly Ile Tyr Asn Ile Glu Glu Met Lys
145 150 155 160

Asn Cys Ser Phe Asn Ala Thr Thr Glu Leu Arg Asp Lys Lys His Lys

165	170	175
Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Glu Asn 180 185 190		
Ser Asp Asn Phe Thr Tyr Arg Leu Ile Asn Cys Asn Thr Ser Thr Ile 195 200 205		
Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr 210 215 220		
Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe 225 230 235 240		
Asn Gly Thr Gly Pro Cys Tyr Asn Val Ser Thr Val Gln Cys Thr His 245 250 255		
Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu 260 265 270		
Ala Glu Glu Gly Ile Ile Ile Arg Ser Glu Asn Leu Thr Glu Asn Thr 275 280 285		
Lys Thr Ile Ile Val His Leu Asn Glu Ser Val Glu Ile Asn Cys Thr 290 295 300		
Arg Pro Asn Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro Gly Gln 305 310 315 320		
Ala Phe Tyr Ala Thr Asn Asp Val Ile Gly Asn Ile Arg Gln Ala His 325 330 335		
Cys Asn Ile Ser Thr Asp Arg Trp Asn Lys Thr Leu Gln Gln Val Met 340 345 350		
Lys Lys Leu Gly Glu His Phe Pro Asn Lys Thr Ile Gln Phe Lys Pro 355 360 365		
His Ala Gly Gly Asp Leu Glu Ile Thr Met His Ser Phe Asn Cys Arg 370 375 380		
Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asn Leu Phe Asn Ser Thr Tyr 385 390 395 400		

His Ser Asn Asn Gly Thr Tyr Lys Tyr Asn Gly Asn Ser Ser Ser Pro
 405 410 415

Ile Thr Leu Gln Cys Lys Ile Lys Gln Ile Val Arg Met Trp Gln Gly
 420 425 430

Val Gly Gln Ala Thr Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys
 435 440 445

Arg Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly Gly Phe Asn
 450 455 460

Thr Thr Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg
 465 470 475 480

Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys
 485 490 495

Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg
 500 505 510

Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly
 515 520 525

Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln
 530 535 540

Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu
 545 550 555 560

Lys Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val Trp Gly
 565 570 575

Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys
 580 585 590

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Arg Leu Ile Cys
 595 600 605

Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Glu Lys
 610 615 620

Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Ser
625 630 635 640

Asn Tyr Thr Gly Leu Ile Tyr Asn Leu Leu Glu Asp Ser Gln Asn Gln
645 650 655

Gln Glu Lys Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys Trp Asn Asn
660 665 670

Leu Trp Asn Trp Phe Asp Ile Ser Asn Trp Pro Trp Tyr Ile Lys Ile
675 680 685

Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala
690 695 700

Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser
705 710 715 720

Phe Gln Thr Leu Thr Pro Ser Pro Arg Gly Leu Asp Arg Leu Gly Gly
725 730 735

Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg Leu
740 745 750

Val Ser Gly Phe Leu Ser Leu Ala Trp Asp Asp Leu Arg Asn Leu Cys
755 760 765

Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala Val Arg
770 775 780

Ala Val Glu Leu Leu Gly His Ser Ser Leu Arg Gly Leu Gln Arg Gly
785 790 795 800

Trp Glu Ile Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu
805 810 815

Glu Leu Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Thr
820 825 830

Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Val Gln Arg Ile Cys
835 840 845

Arg Ala Ile Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Ala
850 855 860

Ala Leu Leu
865

<210> 145
<211> 869
<212> PRT
<213> Human immunodeficiency virus TV1.8_5

<400> 145

Met Arg Val Met Gly Thr Gln Lys Asn Cys Gln Gln Trp Trp Ile Trp
1 5 10 15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Thr Glu Asp Leu
20 25 30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Glu Ala Lys Thr
35 40 45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val His
50 55 60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
65 70 75 80

Glu Ile Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
85 90 95

Asn Met Ala Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln
100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
115 120 125

Cys Thr Asp Thr Asn Val Thr Gly Asn Arg Thr Val Thr Gly Asn Thr
130 135 140

Asn Asp Thr Asn Ile Ala Asn Ala Thr Tyr Lys Tyr Glu Glu Met Lys
145 150 155 160

Asn Cys Ser Phe Asn Ala Thr Thr Glu Leu Arg Asp Lys Lys His Lys
165 170 175

Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Ile Val Pro Leu Asn Glu Asn
180 185 190

Ser Asn Asn Phe Thr Tyr Arg Leu Ile Asn Cys Asn Thr Ser Thr Ile
195 200 205

Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr
210 215 220

Cys Ala Pro Ala Asp Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe
225 230 235 240

Asn Gly Thr Gly Pro Cys Tyr Asn Val Ser Thr Val Gln Cys Thr His
245 250 255

Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu
260 265 270

Ala Glu Glu Gly Ile Ile Ile Arg Ser Glu Asn Leu Thr Glu Asn Thr
275 280 285

Lys Thr Ile Ile Val His Leu Asn Glu Ser Val Glu Ile Asn Cys Thr
290 295 300

Arg Pro Asn Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro Gly Gln
305 310 315 320

Ala Phe Tyr Ala Thr Asn Asp Val Ile Gly Asn Ile Arg Gln Ala His
325 330 335

Cys Asn Ile Ser Thr Asp Arg Trp Asn Lys Thr Leu Gln Gln Val Met
340 345 350

Lys Lys Leu Gly Glu His Phe Pro Asn Lys Thr Ile Lys Phe Glu Pro
355 360 365

His Ala Gly Gly Asp Leu Glu Ile Thr Met His Ser Phe Asn Cys Arg
370 375 380

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asn Leu Phe Asn Ser Thr Tyr
385 390 395 400

Tyr Pro Lys Asn Gly Thr Tyr Lys Tyr Asn Gly Asn Ser Ser Leu Pro
 405 410 415

Ile Thr Leu Gln Cys Lys Ile Lys Gln Ile Val Arg Met Trp Gln Gly
 420 425 430

Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys
 435 440 445

Arg Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly Gly Phe Asn
 450 455 460

Asn Thr Asn Asn Asp Thr Glu Glu Thr Phe Arg Pro Gly Gly Gly Asp
 465 470 475 480

Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu
 485 490 495

Ile Lys Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val
 500 505 510

Gln Arg Lys Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe
 515 520 525

Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr
 530 535 540

Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn
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Leu Leu Lys Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val
 565 570 575

Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu Arg Tyr
 580 585 590

Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Arg Leu
 595 600 605

Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser
 610 615 620

Glu Ala Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu
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Ile Asn Asn Tyr Thr Glu Thr Ile Phe Arg Leu Leu Glu Asp Ser Gln
645 650 655

Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys Trp
660 665 670

Asn Asn Leu Trp Asn Trp Phe Asp Ile Ser Asn Trp Leu Trp Tyr Ile
675 680 685

Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile
690 695 700

Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro
705 710 715 720

Leu Ser Phe Gln Thr Leu Thr Pro Ser Pro Arg Gly Leu Asp Arg Leu
725 730 735

Gly Gly Ile Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile
740 745 750

Arg Leu Val Ser Gly Phe Leu Ser Leu Ala Trp Asp Asp Leu Arg Ser
755 760 765

Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala
770 775 780

Val Arg Ala Val Glu Leu Leu Gly His Ser Ser Leu Arg Gly Leu Gln
785 790 795 800

Arg Gly Trp Glu Ile Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp
805 810 815

Gly Leu Glu Leu Lys Lys Ser Ala Ile Ser Pro Leu Asp Thr Ile Ala
820 825 830

Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Val Gln Arg
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Ile Cys Arg Ala Ile Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe

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855

860

Glu Ala Ala Leu Leu

865

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Trp Val Thr Val Tyr Tyr Gly Val Pro Val Gly Arg Glu Ala Lys Thr
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Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val His
 50 55 60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
 65 70 75 80

Glu Val Ile Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
 85 90 95

Asp Met Val Asp Gln Met Gln Glu Asp Ile Ile Ser Leu Trp Asp Gln
 100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
 115 120 125

Cys Thr Asn Ala Thr Val Asn Tyr Asn Asn Thr Ser Lys Asp Met Lys
 130 135 140

Asn Cys Ser Phe Tyr Val Thr Thr Glu Leu Arg Asp Lys Lys Lys Lys
 145 150 155 160

Glu Asn Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Asn Arg
 165 170 175

Lys Asn Gly Asn Ile Asn Asn Tyr Arg Leu Ile Asn Cys Asn Thr Ser
180 185 190

Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile
195 200 205

His Tyr Cys Ala Pro Ala Gly Tyr Ala Pro Leu Lys Cys Asn Asn Lys
210 215 220

Lys Phe Asn Gly Ile Gly Pro Cys Asp Asn Val Ser Thr Val Gln Cys
225 230 235 240

Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
245 250 255

Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asn
260 265 270

Asn Val Lys Thr Ile Ile Val His Leu Asn Glu Ser Ile Glu Ile Lys
275 280 285

Cys Thr Arg Pro Gly Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro
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Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln
305 310 315 320

Ala His Cys Asn Ile Ser Lys Asn Glu Trp Asn Thr Thr Leu Gln Arg
325 330 335

Val Ser Gln Lys Leu Gln Glu Leu Phe Pro Asn Ser Thr Gly Ile Lys
340 345 350

Phe Ala Pro His Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe
355 360 365

Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Thr Asp Leu Phe Asn
370 375 380

Ser Thr Tyr Ser Asn Gly Thr Cys Thr Asn Gly Thr Cys Met Ser Asn
385 390 395 400

Asn Thr Glu Arg Ile Thr Leu Gln Cys Arg Ile Lys Gln Ile Ile Asn
 405 410 415
 Met Trp Gln Glu Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly
 420 425 430
 Asn Ile Thr Cys Arg Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp
 435 440 445
 Gly Gly Asp Asn Asn Thr Glu Thr Glu Thr Phe Arg Pro Gly Gly Gly
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 Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val
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 Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Ala Ala Lys Arg Arg Val
 485 490 495
 Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly
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 Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu
 515 520 525
 Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
 530 535 540
 Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr
 545 550 555 560
 Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu Arg
 565 570 575
 Tyr Leu Gln Asp Gln Gln Leu Leu Gly Leu Trp Gly Cys Ser Gly Lys
 580 585 590
 Leu Ile Cys Thr Thr Asn Val Leu Trp Asn Ser Ser Trp Ser Asn Lys
 595 600 605
 Thr Gln Ser Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg
 610 615 620
 Glu Ile Ser Asn Tyr Thr Asn Thr Ile Tyr Arg Leu Leu Glu Asp Ser

625	630	635	640
Gln Ser Gln Gln Glu Arg Asn Glu Lys Asp Leu Leu Ala Leu Asp Arg	645	650	655
Trp Asn Asn Leu Trp Asn Trp Phe Ser Ile Thr Asn Trp Leu Trp Tyr	660	665	670
Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile	675	680	685
Ile Phe Ala Val Leu Ser Leu Val Asn Arg Val Arg Gln Gly Tyr Ser	690	695	700
Pro Leu Ser Leu Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Asp Arg	705	710	715
Leu Gly Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Ser Ser Arg Ser	725	730	735
Ile Arg Leu Val Ser Gly Phe Leu Thr Leu Ala Trp Asp Asp Leu Arg	740	745	750
Ser Leu Cys Leu Phe Cys Tyr His Arg Leu Arg Asp Phe Ile Leu Ile	755	760	765
Val Val Arg Ala Val Glu Leu Leu Gly His Ser Ser Leu Arg Gly Leu	770	775	780
Gln Arg Gly Trp Gly Thr Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr	785	790	795
Trp Gly Leu Glu Leu Lys Lys Ser Ala Ile Asn Leu Leu Asp Thr Ile	805	810	815
Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Leu Glu Phe Ile Gln	820	825	830
Asn Leu Cys Arg Gly Ile Arg Asn Val Pro Arg Arg Ile Arg Gln Gly	835	840	845
Phe Glu Ala Ala Leu Gln	850		

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 Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val His
 50 55 60
 Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
 65 70 75 80
 Glu Ile Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
 85 90 95
 Asn Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln
 100 105 110
 Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
 115 120 125
 Cys Thr Asn Thr Asn Val Thr Gly Asn Arg Thr Val Thr Gly Asn Ser
 130 135 140
 Asn Ser Asn Xaa Xaa Ala Xaa Ala Xaa Tyr Xaa Xaa Glu Glu Met Lys
 145 150 155 160
 Asn Cys Ser Phe Asn Val Thr Thr Glu Leu Arg Asp Lys Lys His Lys
 165 170 175
 Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Ile Val Pro Leu Asn Asn Xaa
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 Glu Asn Ser Asn Asn Phe Thr Tyr Arg Leu Ile Asn Cys Asn Thr Ser
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 Thr Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile
 210 215 220

His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys
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Thr Phe Asn Gly Thr Gly Pro Cys Tyr Asn Val Ser Thr Val Gln Cys
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Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
 260 265 270

Ser Leu Ala Glu Glu Gly Ile Ile Ile Arg Ser Glu Asn Leu Thr Glu
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Asn Thr Lys Thr Ile Ile Val His Leu Asn Glu Ser Val Glu Ile Asn
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Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro
 305 310 315 320

Gly Gln Ala Phe Tyr Ala Thr Asn Asp Ile Ile Gly Asn Ile Arg Gln
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Ala His Cys Asn Ile Ser Thr Asp Arg Trp Asn Lys Thr Leu Gln Gln
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Val Met Lys Lys Leu Gln Glu His Phe Pro Asn Lys Thr Xaa Ile Lys
 355 360 365

Phe Lys Pro His Ala Gly Gly Asp Leu Glu Ile Thr Met His Ser Phe
 370 375 380

Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asn Leu Phe Asn
 385 390 395 400

Ser Thr Tyr His Asn Xaa Xaa Xaa Xaa Asn Gly Thr Tyr Lys Tyr Asn
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Gly Asn Ser Ser Xaa Pro Ile Thr Leu Gln Cys Lys Ile Lys Gln Ile
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Ile Arg Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile
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Ala Lys Arg Arg Val Val 515	Gln Arg Glu Lys Arg 520	Ala Val Gly Ile Gly 525
Ala Val Phe Leu Gly Phe 530	Leu Gly Ala Ala Gly 535	Ser Thr Met Gly Ala 540
Ala Ser Ile Thr Leu Thr 545	Val Gln Ala Arg Gln 550 555	Leu Leu Ser Gly Ile 560
Val Gln Gln Gln Ser 565	Asn Leu Leu Lys Ala 570	Ile Glu Ala Gln Gln His 575
Met Leu Gln Leu Thr Val 580	Trp Gly Ile Lys Gln 585	Leu Gln Ala Arg Val 590
Leu Ala Ile Glu Arg Tyr 595	Leu Lys Asp Gln Gln 600	Leu Leu Gly Ile Trp 605
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Ser Trp Ser Asn Lys Ser 625	Glu Ala Asp Ile Trp 630 635	Asp Asn Met Thr Trp 640
Met Gln Trp Asp Arg 645	Glu Ile Ser Asn Tyr 650	Thr Asn Thr Ile Tyr Arg 655
Leu Leu Glu Asp Ser 660	Gln Asn Gln Gln Glu 665	Lys Asn Glu Lys Asp Leu 670
Leu Glu Leu Asp Lys Trp 675	Asn Asn Leu Trp Asn 680	Trp Phe Asp Ile Ser 685

Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu
690 695 700

Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val
705 710 715 720

Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr Pro Ser Pro
725 730 735

Arg Gly Pro Asp Arg Leu Gly Gly Ile Glu Glu Glu Gly Gly Glu Gln
740 745 750

Asp Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ser Leu Ala
755 760 765

Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg
770 775 780

Asp Phe Ile Leu Ile Ala Val Arg Ala Val Glu Leu Leu Gly His Ser
785 790 795 800

Ser Leu Arg Gly Leu Gln Arg Gly Trp Glu Ile Leu Lys Tyr Leu Gly
805 810 815

Ser Leu Val Gln Tyr Trp Gly Leu Glu Leu Lys Lys Ser Ala Ile Ser
820 825 830

Leu Leu Asp Thr Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile
835 840 845

Ile Glu Leu Val Gln Arg Ile Cys Arg Ala Ile Leu Asn Ile Pro Arg
850 855 860

Arg Ile Arg Gln Gly Phe Glu Ala Ala Leu Leu
865 870 875